Drinking Water Surveillance Program

LINDSAY WATER TREATMENT PLANT

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LINDSAY
WATER TREATMENT PLANT

DRINKING WATER SURVEILLANCE PROGRAM

ANNUAL REPORT 1989

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EXECUTIVE SUMMARY

DRINKING WATER SURVEILLANCE PROGRAM

LINDSAY WATER TREATMENT PLANT
1989 ANNUAL REPORT

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. In 1989 there were 65 supplies being monitored.

The Lindsay Water Treatment Plant is a package plant that treats water from the Scugog River. The process consists of coagulation, flocculation and sedimentation using an upflow solids contact clarifier, filtration and disinfection. The Lindsay plant has a design capacity of 22.73 X 1000 M^3/day and supplies a population of approximately 15,000.

Water samples from the plant: raw and treated and two distribution system sites were taken on a monthly basis beginning in April and analyzed for 180 parameters. Parameters were divided into the following groups: Bacteriological, Inorganic and Physical (Laboratory Chemistry, Field Chemistry and Metals) and Organic (Chloroaromatics, Chlorophenols, Pesticides and PCB, Phenolics, Polynuclear Aromatic Hydrocarbons, Specific Pesticides and Volatiles). Chlorophenols and Specific Pesticides were analyzed in June and November only.

A summary of results is shown in Table A.

The Ontario Drinking Water Objective (ODWO) of 1 FTU for turbidity was exceeded in one treated water sample. The District Officer was notified. All other Inorganic and Physical parameters were below any applicable health related ODWOs.

Of a total of approximately 110 Organic parameters tested for on a monthly basis, none exceeded health related guidelines.

During 1989 the DWSP sampling results indicated that the Lindsay Water Treatment Plant produced acceptable quality water at the plant.

TABLE A

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP

SUMMARY TABLE BY SCAN

		RAW			TREATED			SITE 1			SITE 3			SITE 2		
	SCAN	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE	TESTS	POSITIVE	%POSITIVE
	BACTERIOLOGICAL	27	24	88	27	8	29	21	2	9	3	1	33	24	11	45
	CHEMISTRY (FLD)	27	26	96	51	49	96	90	87	96	10	10	100	86	71	82
	CHEMISTRY (LAB)	189	168	88	188	144	76	295	255	86	37	31	83	294	265	90
	METALS	216	131	60	216	116	53	376	234	62	47	20	42	376	229	60
	CHLOROAROMATICS	126	0	0	125	0	0	111	0	0	14	0	0	112	0	0
	CHLOROPHENOLS	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	PAH	139	0	0	139	0	0	.	.	.	.	.	.	.	.	.
	PESTICIDES & PCB	306	0	0	306	1	0	220	1	0	21	0	0	220	1	0
	PHENOLICS	9	8	88	9	9	100	.	.	.	.	.	.	.	.	.
	SPECIFIC PESTICIDES	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	VOLATILES	232	0	0	261	42	16	232	30	12	29	3	10	203	24	11
TOTAL		1280	357		1331	369		1353	609		162	65		1323	601	

THE ODWO OF 1 FTU FOR TURBIDITY WAS EXCEEDED ONCE, NO OTHER HEALTH RELATED GUIDELINE WAS EXCEEDED.

A POSITIVE VALUE DENOTES THAT THE RESULT IS GREATER THAN THE STATISTICAL LIMIT OF DETECTION AND IS QUANTIFIABLE
A '.' INDICATES THAT NO SAMPLE WAS TAKEN

DRINKING WATER SURVEILLANCE PROGRAM

LINDSAY WATER TREATMENT PLANT
1989 ANNUAL REPORT

INTRODUCTION

The Drinking Water Surveillance Program (DWSP) for Ontario is a monitoring program providing immediate, reliable, current information on drinking water quality. The DWSP officially began in April 1986 and is designed to eventually include all municipal supplies in Ontario. In 1989 there were 65 plants being monitored. Appendix A carries a fill description of the DWSP.

The DWSP was initiated for the Lindsay Water Treatment Plant in April of 1989.

This report contains information and results for 1989.

PLANT DESCRIPTION

The Lindsay Water Treatment Plant is a package plant that treats water from the Scugog River. The process consists of coagulation, flocculation and sedimentation in an upflow solids contact clarifier, filtration and disinfection. The Lindsay plant has a design capacity of 22.73 X 1000 M^3/day and flows for day of

sampling ranging from 9.0 x 1000 m^3/day to 14.0 x 1000 m^3/day. The plant serves a population of approximately 15,000.

The plant location is shown in Figure 1. Plant process details, in a block schematic, are shown in Figure 2. General plant information is presented in Table 2.

SAMPLING LOCATIONS

Water samples were obtained from four DWSP approved locations;

i) Raw - The water originated at the screen well prior to chlorination and was sampled through stainless steel sample lines connected to a DWSP approved pump. The sample tap is located at the screen well.

ii) Treated - The water originated from the distribution main after addition of all treatment chemicals and was sampled through a stainless steel sample line. The sample tap is located on the distribution main.

iii) Site 1 - The distance that this site is from the from the plant is unavailable. The plumbing that the water was sampled through is unknown as is the location if the sample tap. The Site was changed to Site 3 in December.

FIGURE 1

DRINKING WATER SURVEILLANCE PROGRAM

SITE LOCATION MAP

LINDSAY WATER TREATMENT PLANT

FIGURE 2

LINDSAY WTP

SCHEMATIC

CHARACTERISTICS

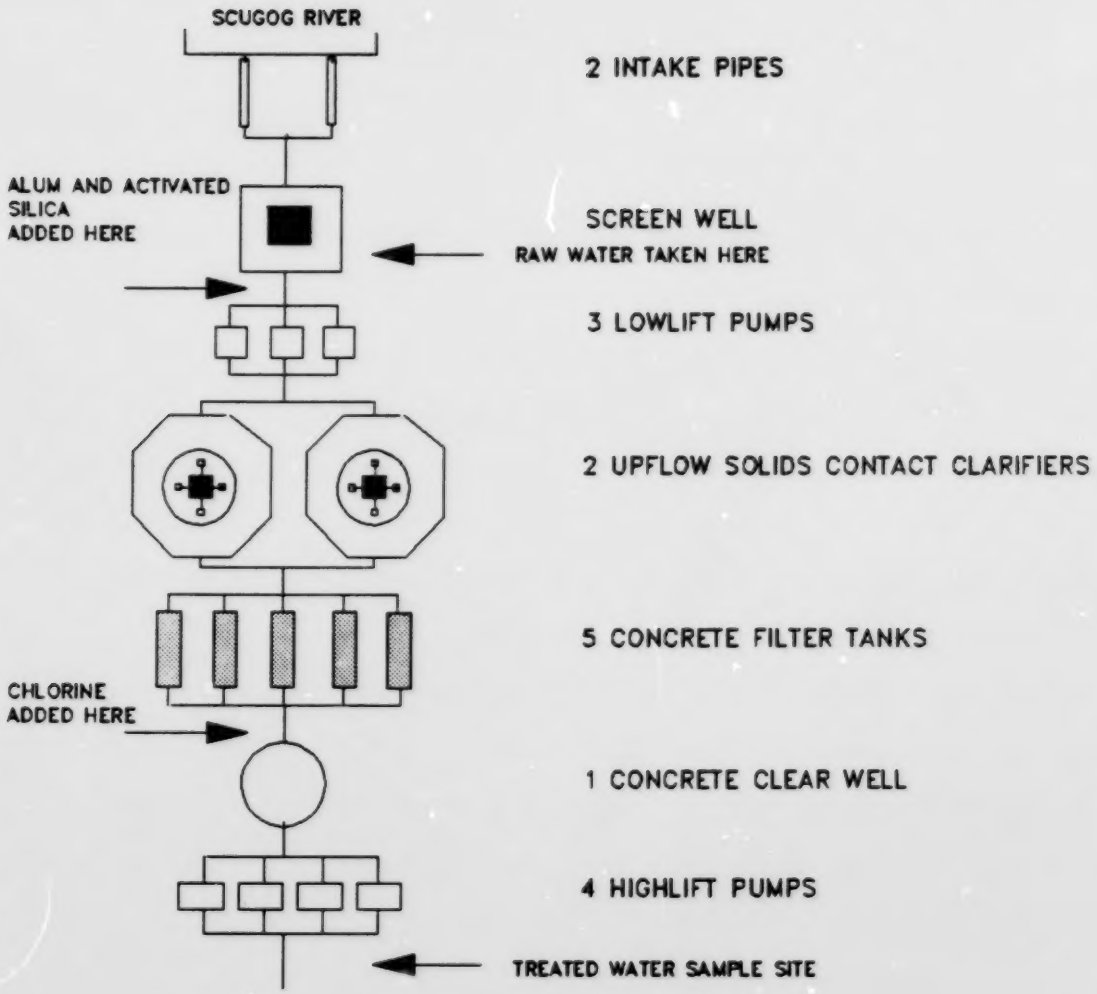

TABLE 1

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

IN-PLANT MONITORING LINDSAY WATER TREATMENT PLANT 1989

PARAMETER	LOCATION	FREQUENCY
Chlorine Residual - free	Distribution main	hourly
total	Distribution main	daily
pH	Screen channel	daily
	Distribution main	daily
Temperature	Lowlift pump header	continuous
Turbidity	Screen channel	daily
	Distribution main	continuous

TABLE 2

DRINKING WATER SURVEILLANCE PROGRAM ANNUAL REPORT

GENERAL INFORMATION

LINDSAY WATER TREATMENT PLANT

LOCATION:	MARY STREET EAST LINDSAY, ONTARIO (705-324-5411)
SOURCE:	RAW WATER SOURCE - SCUGOG RIVER
DESIGN CAPACITY:	22.73 x 1000M^3/DAY
OPERATION:	MUNICIPAL
GENERAL MANAGER:	D. HARTWELL
MINISTRY REGION:	CENTRAL
DISTRICT OFFICER:	MR. J. BOURQUE

MUNICIPALITY SERVED	POPULATION
LINDSAY	15,000

TABLE 1

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DISTRICT OFFICER:	MR. J. BOURQUE

MUNICIPALITY SERVED	POPULATION
LINDSAY	15,000

iv) Site 2 - This site is approximately 2.2 kilometres from the plant. Water is sampled through PVC plumbing, the sample tap is located in the kitchen sink.

v) Site 3 - This site is approximately 3.9 kilometres from the plant. Water is sampled through copper plumbing, the sample tap is located in the laundry room.

SAMPLING AND ANALYSES

Sample lines in the plant were flushed prior to sampling to ensure that the water obtained was indicative of its origin and not residual water standing in the sample line.

At all distribution system locations two types of samples were obtained: a standing and a free flow. The standing sample consisted of water that had been in the household plumbing and service connection for a minimum of six hours. These samples are used to make an assessment of the amount by which the levels of inorganic compounds and metals may be changed on standing, due to leaching from (or deposition on), the plumbing system. The only analysis carried out on the standing samples therefore, are General

Chemistry and Metals. The free flow sample represented fresh water from the distribution main that had been flowing at the sample tap for five minutes before being sampled.

Attempts were made to capture the same block of water at each sampling point by taking the retention time into consideration. The retention time was calculated by dividing the volume of water between the two sampling points by the sample day flow. For example, if it was determined that the retention time within the plant was five hours then there would be a five hour interval between the raw and treated sampling. Similarly, if it was estimated that it took approximately one day for the water to travel from the plant to the distribution system site, this site would be sampled one day after the treated water from the plant.

Stringent DWSP sampling protocols were followed to ensure that all samples were taken in a uniform manner.

Plant operational personnel perform analyses on parameters for process control (Table 1).

The Lindsay Water Treatment Plant, raw and treated water and two distribution system locations were sampled for approximately 180 parameters on a monthly basis beginning in April. The Specific Pesticides and Chlorophenols scans were sampled in June and November only. Polynuclear Aromatic Hydrocarbons and Phenolics are

only analyzed in the raw and treated water at the plant. As of August the triazine pesticides were only analyzed in the raw and treated water. Laboratory analysis was conducted at the Ministry of the Environment facilities in Rexdale, Ontario.

RESULTS

Field Chemistry measurements were recorded on the day of sampling and were entered onto the DWSP data base as submitted by plant personnel.

Table 3 contains information on the sample day retention time, flow rate and treatment chemicals used and their associated dosages.

Table 4 is a summary break-down of the number of water samples analyzed by parameter and by water type. The number of times that a positive or trace result was detected is also reported.

Positive denotes that the result is greater than the statistical limit of detection established by the Ministry of the Environment (MOE) laboratory staff and is quantifiable. Trace (<T) denotes that the level measured is greater than the lowest value detectable by the method but lies so close to the detection limit that it cannot be confidently quantified.

Table 5 presents the results for parameters detected on at least one occasion.

Table 6 lists all parameters analyzed in the DWSP.

Associated guidelines and detection limits are also supplied on tables 5 and 6. Parameters are listed alphabetically within each scan.

DISCUSSION

General

Water quality is judged by comparison with the Ontario Drinking Water Objectives (ODWO's) as defined in the 1984 publication (ISBN 0-7743-8985-0). The Province of Ontario has health related and aesthetic objectives for 49 parameters, these are currently under review. When an ODWO is not available guidelines/limits from other agencies are consulted. The Parameter Listing System (PALIS) recently published (ISBN 0-7729-4461-X) by the MOE catalogues and keeps current over 1750 guidelines for 650 parameters from agencies throughout the world.

Many of the compounds detected are naturally occurring or are treatment by-products.

Plant operational personnel address occurrences of taste and odour

or biological water quality parameters. The DWSP does not assess these aspects of the water supply.

As stated under Results, traces do not indicate quantifiable results as defined by established MOE laboratory analytical reporting protocols. While they can be useful in trend analysis or confirmation of the presence of a specific contaminant that is repeatedly detected at these levels, the occasional finding of a trace level of a contaminant is not considered to be significant. **DISCUSSION OF GUIDELINES AND LIMITS THEREFORE, IS ONLY CONDUCTED ON POSITIVE RESULTS.**

Bacteriology

Positive results for the Bacteriology scan were present eight times in the treated water, twice in the Site 1 water, eleven in the Site 2 water and in the one Site 3 water sample. The positive parameters were Standard Plate Count, Total Coliform and/or Total Coliform Background.

Total Coliforms at 3/100 mL were detected by the membrane filtration test in the August Site 2 sample.

Standard Plate Count is a test used to supplement routine analysis for Coliform bacteria. The limit for Standard Plate Count (at 35°C after 48 hours) in the ODWOs is 500 organisms per mL (based on a

geometric mean of 5 or more samples). High Standard Plate Counts were present in the May and September treated water samples, the May Site 1 water and the April, July, and August Site 2 water samples. While no indicators of unsafe water were detected at this time, the high Standard Plate Count may generally be a result of the higher temperatures in the summer months. A total Chlorine Residual of at least 0.05 mg/L was detected in all distribution system samples that showed high standard plate counts. No samples contained bacteriological results over any applicable health related ODWOs.

Guidelines for bacteriological sampling and testing of a supply are developed to maintain a proper supervision of its bacteriological quality; the routine monitoring program usually requires the taking of multiple samples in a given system. Full interpretation of bacteriological quality cannot be made on the basis of single samples. Further, bacteriological limits were developed in acknowledgement that the presence of coliforms may be detected due to their non-uniform distribution throughout the distribution system and the fact that their enumeration is subject to considerable variation. For these reasons, the occasional finding of low numbers of coliform organisms is not unexpected. Routine bacteriological monitoring, as outlined in the ODWOs is carried out by the operating authority.

Inorganic and Physical

Laboratory and Field Chemistry

The aesthetic ODWO of 5 True Colour Units (TCU) was exceeded in seven treated water samples, seven Site 1 free flow waters and eight Site 2 water samples. Colour in drinking water may be due to the presence of natural or synthetic organic substances as well as certain metallic ions.

It is desirable that the Temperature of drinking water be less than 15°C; the palatability of water is enhanced by its coolness. A temperature below 15°C will tend to reduce the growth of nuisance organisms and hence minimize associated taste, colour, odour and corrosion problems. The temperature of the delivered water may increase in the distribution system due to the warming effect of the soil in late summer and fall and/or as a result of higher temperatures in the source water. The desired ODWO was exceeded six times in the treated water.

The ODWO recommend a hardness level of between 80 and 100 mg/L as calcium carbonate for domestic waters, to provide an acceptable balance between corrosion and encrustation. Water supplies with a hardness greater than 200 mg/L are considered poor, and would possess a tendency to form scale deposits and result in excessive soap consumption. The Lindsay water had hardness values ranging

from 166 mg/L to 248 mg/L.

Conductivity, a result of the high hardness levels, ranged from 355 to 540 UMHO/cm. The European Economic Community (EEC) aesthetic guideline level for Conductivity is 400 UMHO/cm.

The Langelier Index is used extensively in estimating the corrosion potential of water. An increasingly negative index indicates the increasing possibility of corrosion. It is considered sound engineering practice to maintain a slightly positive Langelier Index. The Langelier Index for Lindsay with the exception of August was positive.

Turbidity in water is caused by the presence of suspended matter such as clay, silt, colloidal particles, plankton and other microscopic organisms. The most important potential health effect of Turbidity is its interference with disinfection in the treatment plant and the maintenance of a chlorine residual. The ODWO of 1 Formazin Turbidity Unit (FTU) was exceeded in the November treated water sample with a field turbidity value of 1.28 FTU. The District Officer was notified. All other turbidity values above 1 FTU reported by the laboratory were not supported by the field turbidity levels. Protocol for turbidity states that measurements should be made within 48 hours. This is not always achieved except when measured in the field, the field turbidity values therefore are considered more reliable.

Metals

The results reported for the Metals scan were below any applicable health related ODWOs.

Iron and Manganese levels were lower in the treated water as compared to the raw water. This is a result of the treatment process. The addition of Alum as a coagulant to the raw water and the resulting coagulation/settling process has been shown to reduce the levels of most metals.

Elevated levels of Copper, Lead and Zinc were detected in the standing samples as compared to the free flow distribution samples, indicating that very small quantities of these metals were leached from the household plumbing as the water stood overnight. Although the Langelier Index indicates minimal potential for corrosion some metals will be leached in standing samples in most supplies.

Iron and Manganese levels were high in the standing and free flow waters from Site 2. The distribution main supplying this Site is made of iron and until July this Site was located at a dead end where the flow of water is intermittent. The aesthetic ODWO for Iron of 300 µg/L was exceeded in April, May and June as was the aesthetic ODWO for Manganese of 50 µg/L. The main was changed to PVC and looped into the system for continuous flow. A copper service connection was also installed at this time.

At present, there is no evidence that Aluminum is physiologically harmful and no health limit for drinking water has been specified. The measure of residual Aluminum in the treated water is important to indicate the efficiency of the treatment process. The ODWOs indicate that a useful guideline is to maintain a residual below 100 ug/L as Al in the water leaving the plant to avoid problems in the distribution system. Aluminum values exceeded the ODWO operational guideline in all treated water samples with the exception of April.

Organic Parameters

Chloroaromatics

The results of the Chloroaromatics scan showed that no chloroaromatics were detected.

Chlorophenols

The results of the Chlorophenols scan showed that no Chlorophenols were detected.

The maximum desirable concentration of phenolic substances in drinking water is 2.0 ug/L. This limit has been set primarily to prevent the occurrence of undesirable tastes and odours, particularly in chlorinated water. Phenolics were detected at levels ranging from 0.8 to 4.6 ug/L in the raw water and 1.0 to

3.8 ug/L in the treated water.

Pesticides and PCB (Polychlorinated Biphenyls)

The results of the Pesticides and PCB scan showed that no PCBs were detected and that three pesticides were detected:

Alpha BHC

Atrazine

Cyanazine

There are several isomers of BHC (Benzene Hexachloride); gamma BHC is the active ingredient of the pesticide Lindane; while alpha BHC is the isomer predominantly found in surface waters from the Great Lakes Basin as indicated in results from other water supplies on DWSP.

Alpha BHC was detected at a trace level, once in the treated water.

Atrazine was detected in the June treated water at 540 ng/L, the Site 1 water at 620 ng/L and the Site 2 water at 630 ng/L. Health and Welfare Canada's Interim Maximum Acceptable Concentration for Atrazine in drinking water is 60,000 ng/L. Atrazine was also detected at trace levels in July, in the raw water and in the treated water and in both distributed water samples.

Cyanazine (Bladex) was detected at trace levels in June, in the raw water, treated water and in both distributed water samples.

Late spring/early summer appears to be the time of year when pesticides use/application is at its maximum; this combined with the shallow, low flow nature of the Scugog River may account for the occurrence of some of these pesticides.

Specific Pesticides

Results of the Specific Pesticides scan showed that no specific pesticides were detected.

Polynuclear Aromatic Hydrocarbons (PAHs)

The results of the PAH scan showed that no PAHs were detected.

Volatiles

The results of the Volatiles scan showed that nine parameters, other than Trihalomethanes(THMs), were detected:

Benzene

Toluene

Ethylbenzene

M-Xylene

O-Xylene

Styrene

1,1,1 Trichloroethane

Carbon Tetrachloride

Tetrachloroethylene

Benzene was detected in the treated water in May (0.95 µg/L), June (1.4 µg/L), July (0.5 µg/L) and August (1.2 µg/L), it was also detected in the Site 1 water in May (0.60 µg/L) and June (0.60 µg/L) and in the Site 2 water in August (0.80 µg/L). The Maximum Acceptable Concentration set by Health and Welfare Canada for Benzene in drinking water is 5.0 µg/L. Benzene was also detected at trace levels, three times in the raw water, twice in the treated water, four times in the Site 1 water and three times in the Site 2 water.

Toluene was detected in the treated water in May (1.80 µg/L), June (2.4 µg/L) and August (0.55 µg/L), it was also detected in the Site 1 water in May (0.90 µg/L) and June (0.55 µg/L). The Aesthetic Objective set by Health and Welfare Canada for Toluene in drinking water is 24.0 µg/L. Toluene was also detected at trace levels, three times in the treated water, twice in the Site 1 water and four times in the Site 2 water.

Ethylbenzene was detected at trace levels, five times in the treated water and three times in the Site 1 water.

Meta-Xylene (M-Xylene) was detected in the treated water in June (1.4 µg/L) and July (1.0 µg/L). The Aesthetic Objective set by Health and Welfare Canada for Total Xylenes in drinking water is 300 µg/L. M-Xylene was also detected at trace levels, three times

in the treated water and five times in the Site 1 water.

Ortho-Xylene (O-Xylene) was detected in the treated water in May (1.0 µg/L), June (0.90 µg/L) and July (1.0 ug/L). The Aesthetic Objective cited above also applies. O-Xylene was also detected at trace levels, once in the raw water, three times in the treated water, five times in the Site 1 water and once in the Site 2 water.

Styrene was detected at trace levels, five times in the treated water, five times in the Site 1 water and twice in the Site 2 water.

The volatiles listed above are typically found on an occasional basis at other water supplies included on the DWSP. They are more prevalent in the treated and distributed water and their concentrations are rarely above trace levels. At Lindsay the occurrence of positive values seems to be a summer phenomena since levels have dropped by September. However, further investigation was warranted and the operating authority, ministry regional office and District Officer were notified. A potential source of the contamination is the fuel used to power the standby diesel generator or pump that is often located beside the highlift pumps on the floor above the finished water clear well.

1,1,1 Trichloroethane was detected at a trace level, in the raw water.

Carbon Tetrachloride was detected at a trace level in the Site 1 water.

Tetrachloroethylene was detected in July in the treated water (.50 µg/L), the Site 1 water (0.55 µg/L) and the Site 2 water (0.50 µg/L). Values reported for June were considered to be unreliable due to interference as per the remark UIN. The Tentative Guideline Value for tetrachloroethylene in drinking water set by the World Health Organization is 10 µg/L. Tetrachloroethylene was also detected at trace levels, three times in the treated water, three times in the Site 1 water and four times in the Site 2 water.

THMs are acknowledged to be produced during the water treatment process and will always occur in chlorinated surface waters. THMs are comprised of Chloroform, Chlorodibromomethane and Dichlorobromomethane. Bromoform occurs occasionally. Results are reported for the individual compounds as well as for total THMs.

Chloroform, Dichlorobromomethane and Total THMs were detected in all treated water samples. Chlorodibromomethane was detected at trace levels in all treated waters with the exception of one positive value detected in December. Bromoform was not detected. All Total THM occurrences, ranging from 70 to 272 µg/L were below the ODWO of 350 µg/L.

CONCLUSIONS

The Lindsay Water Treatment Plant for the sample year of 1989 produced acceptable quality water.

The health related ODWO for Turbidity was exceeded in one treated water sample. No other health related guidelines were exceeded during 1989.

RECOMMENDATIONS

Two recommendations can be made:

1) The occurrence of elevated levels of volatiles during the summer months should be investigated.

2) The treatment processes should be optimized to reduce elevated Aluminum levels in treated water samples.

TABLE 3

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP SAMPLE DAY CONDITIONS FOR 1989

	SAMPLE DAY CONDITIONS		TREATMENT CHEMICAL DOSAGES (MG/L)				
			COAGULATION	COAGULATION AID		POST-CHLORINATION	ACTIVATION
DATE	DELAY * TIME(HRS)	FLOW (1000M3)	ALUM LIQUID	POLYELECTROLYTE	SODIUM SILICATE	CHLORINE	CHLORINE
APR 25	4.0	9.0	75.00	.20	6.00	2.30	2.40
MAY 24	4.0	12.0	75.00	.20	6.00	4.20	2.40
JUN 27	4.0	12.0	70.00	.	9.00	4.30	3.50
JUL 25	3.0	14.0	70.00	.	9.00	4.90	3.50
AUG 29	3.0	13.0	70.00	.	8.00	5.90	.
SEP 26	3.0	14.0	70.00	.	6.00	5.80	.
OCT 24	3.0	13.0	70.00	.	8.00	4.20	.
NOV 21	3.0	13.0	100.00	.40	10.00	2.80	.
DEC 12	2.5	13.0	100.00	.80	10.00	2.90	3.90

* THE DELAY TIME BETWEEN THE RAW AND TREATED WATER SAMPLING, SHOULD ESTIMATE THE RETENTION TIME

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY

SUMMARY TABLE OF RESULTS (1989)

SCAN	PARAMETER	RAW			TREATED			SITE 1			SITE 3			SITE 2		
		TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
BACTERIOLOGICAL	FECAL COLIFORM MF	9	7	0	.	.	.	.	.	.	.	.	.	.	.	.
	STANDRD PLATE CNT MF	.	.	.	9	5	0	7	2	0	1	1	0	8	5	0
	TOTAL COLIFORM MF	9	8	0	9	0	0	7	0	0	1	0	0	8	1	0
	T COLIFORM BCKGRD MF	9	9	0	9	3	0	7	0	0	1	0	0	8	5	0
*TOTAL SCAN BACTERIOLOGICAL		27	24	0	27	8	0	21	2	0	3	1	0	24	11	0
*TOTAL GROUP BACTERIOLOGICAL		27	24	0	27	8	0	21	2	0	3	1	0	24	11	0
CHEMISTRY (FLD)	FLD CHLORINE (COMB)	.	.	.	9	7	0	15	15	0	2	2	0	15	12	0
	FLD CHLORINE FREE	1	0	0	9	9	0	14	11	0	2	2	0	12	3	0
	FLD CHLORINE (TOTAL)	.	.	.	9	9	0	15	15	0	2	2	0	15	12	0
	FLD PH	9	9	0	9	9	0	16	16	0	2	2	0	16	16	0
	FLD TEMPERATURE	9	9	0	9	9	0	16	16	0	2	2	0	16	16	0
	FLD TURBIDITY	8	8	0	6	6	0	14	14	0	.	.	.	12	12	0
*TOTAL SCAN CHEMISTRY (FLD)		27	26	0	51	49	0	90	87	0	10	10	0	86	71	0
CHEMISTRY (LAB)	ALKALINITY	9	9	0	9	9	0	16	16	0	2	2	0	16	16	0
	CALCIUM	9	9	0	9	9	0	16	16	0	2	2	0	16	16	0
	CYANIDE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	CHLORIDE	9	9	0	9	9	0	16	16	0	2	2	0	16	16	0
	COLOUR	9	9	0	9	9	0	16	16	0	2	2	0	16	16	0
	CONDUCTIVITY	9	9	0	9	9	0	16	16	0	2	2	0	16	16	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY

SUMMARY TABLE OF RESULTS (1989)

SCAN	PARAMETER	SITE RAW TOTAL	RAW POSITIVE	RAW TRACE	TREATED TOTAL	TREATED POSITIVE	TREATED TRACE	SITE 1 TOTAL	SITE 1 POSITIVE	SITE 1 TRACE	SITE 3 TOTAL	SITE 3 POSITIVE	SITE 3 TRACE	SITE 2 TOTAL	SITE 2 POSITIVE	SITE 2 TRACE
CHEMISTRY (LAB)	FLUORIDE	9	9	0	9	5	4	16	7	9	2	0	1	16	8	8
	HARDNESS	9	9	0	9	9	0	16	16	0	2	2	0	16	16	0
	IONCAL	9	8	0	9	9	0	16	16	0	2	2	0	16	16	0
	LANGELIERS INDEX	9	9	0	8	8	0	15	15	0	2	2	0	14	14	0
	MAGNESIUM	9	9	0	9	9	0	16	16	0	2	2	0	16	16	0
	SODIUM	9	9	0	9	9	0	16	16	0	2	2	0	16	16	0
	AMMONIUM TOTAL	9	7	0	9	3	3	16	11	5	2	1	0	16	14	2
	NITRITE	9	7	2	9	0	9	16	2	14	2	0	2	16	7	9
	TOTAL NITRATES	9	7	0	9	7	0	16	12	1	2	2	0	16	14	0
	NITROGEN TOT KJELD	9	9	0	9	9	0	16	16	0	2	2	0	16	16	0
	PH	9	9	0	9	9	0	16	16	0	2	2	0	16	16	0
	PHOSPHORUS FIL REACT	9	4	4	9	0	3	.	.	.	.	.	.	.	.	.
	PHOSPHORUS TOTAL	9	9	0	9	4	5	.	.	.	.	.	.	.	.	.
	SULPHATE	9	9	0	9	9	0	16	16	0	2	2	0	16	16	0
	TURBIDITY	9	9	0	9	9	0	16	16	0	2	2	0	16	16	0
*TOTAL SCAN CHEMISTRY (LAB)		189	168	6	188	144	24	295	255	29	37	31	3	294	265	19
METALS	SILVER	9	0	1	9	0	1	16	0	4	2	0	0	16	0	1
	ALUMINUM	9	9	0	9	9	0	16	16	0	2	2	0	16	16	0
	ARSENIC	9	3	6	9	1	7	16	5	10	2	0	2	16	2	12
	BARIUM	9	9	0	9	9	0	16	16	0	2	2	0	16	16	0
	BORON	9	5	4	9	6	3	16	14	2	2	1	1	16	11	5
	BERYLLIUM	9	0	6	9	0	6	16	0	14	2	0	0	16	0	10

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY

SUMMARY TABLE OF RESULTS (1989)

		SITE														
		RAW			TREATED			SITE 1			SITE 3			SITE 2		
SCAN	PARAMETER	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
METALS	CADMIUM	9	1	4	9	0	2	16	2	8	2	0	1	16	0	7
	COBALT	9	0	8	9	0	8	16	0	15	2	0	2	16	2	13
	CHROMIUM	9	5	4	9	6	3	16	14	2	2	0	2	16	11	5
	COPPER	9	7	2	9	8	1	16	16	0	2	2	0	16	16	0
	IRON	9	8	1	9	1	5	16	3	12	2	0	2	16	15	1
	MERCURY	9	6	2	9	4	2	8	5	2	1	1	0	8	1	3
	MANGANESE	9	9	0	9	8	1	16	16	0	2	2	0	16	16	0
	MOLYBDENUM	9	5	4	9	6	3	16	11	5	2	0	2	16	7	9
	NICKEL	9	3	1	9	1	3	16	6	5	2	1	0	16	9	2
	LEAD	9	9	0	9	7	1	16	16	0	2	1	1	16	16	0
	ANTIMONY	9	8	1	9	8	1	16	16	0	2	0	2	16	14	2
	SELENIUM	9	0	2	9	0	4	16	0	11	2	0	0	16	0	9
	STRONTIUM	9	9	0	9	9	0	16	16	0	2	2	0	16	16	0
	TITANIUM	9	9	0	9	9	0	16	16	0	2	2	0	16	16	0
	THALLIUM	9	0	6	9	0	5	16	0	5	2	0	0	16	0	8
	URANIUM	9	8	1	9	6	3	16	14	2	2	0	2	16	14	2
	VANADIUM	9	9	0	9	9	0	16	16	0	2	2	0	16	15	1
	ZINC	9	9	0	9	9	0	16	16	0	2	2	0	16	16	0
*TOTAL SCAN METALS		216	131	53	216	116	59	376	234	97	47	20	17	376	229	90
*TOTAL GROUP INORGANIC & PHYSICAL		432	325	59	455	309	83	761	576	126	94	61	20	756	565	109
CHLOROAROMATICS	HEXACHLOROBUTADIENE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	123 TRICHLOROBENZENE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY

SUMMARY TABLE OF RESULTS (1989)

SCAN	PARAMETER	SITE RAW TOTAL	RAW POSITIVE	RAW TRACE	TREATED TOTAL	TREATED POSITIVE	TREATED TRACE	SITE 1 TOTAL	SITE 1 POSITIVE	SITE 1 TRACE	SITE 3 TOTAL	SITE 3 POSITIVE	SITE 3 TRACE	SITE 2 TOTAL	SITE 2 POSITIVE	SITE 2 TRACE
CHLOROAROMATICS	1234 T-CHLOROBENZENE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	1235 T-CHLOROBENZENE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	124 TRICHLOROBENZENE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	1245 T-CHLOROBENZENE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	135 TRICHLOROBENZENE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	HCB	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	HEXACHLOROETHANE	9	0	0	8	0	0	7	0	0	1	0	0	8	0	0
	OCTACHLOROSTYRENE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	PENTACHLOROBENZENE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	236 TRICHLOROTOLUENE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	245 TRICHLOROTOLUENE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	26A TRICHLOROTOLUENE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
*TOTAL SCAN CHLOROAROMATICS		126	0	0	125	0	0	111	0	0	14	0	0	112	0	0
CHLOROPHENOLS	234 TRICHLOROPHENOL	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	2345 T-CHLOROPHENOL	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	2356 T-CHLOROPHENOL	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	245-TRICHLOROPHENOL	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	246-TRICHLOROPHENOL	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	PENTACHLOROPHENOL	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
*TOTAL SCAN CHLOROPHENOLS		0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY

SUMMARY TABLE OF RESULTS (1989)

SCAN	PARAMETER	SITE RAW TOTAL	RAW POSITIVE	RAW TRACE	TREATED TOTAL	TREATED POSITIVE	TREATED TRACE	SITE 1 TOTAL	SITE 1 POSITIVE	SITE 1 TRACE	SITE 3 TOTAL	SITE 3 POSITIVE	SITE 3 TRACE	SITE 2 TOTAL	SITE 2 POSITIVE	SITE 2 TRACE
PAH	PHENANTHRENE	9	0	0	9	0	0	.	.	.	.	.	.	.	.	.
	ANTHRACENE	9	0	0	9	0	0	.	.	.	.	.	.	.	.	.
	FLUORANTHENE	9	0	0	9	0	0	.	.	.	.	.	.	.	.	.
	PYRENE	9	0	0	9	0	0	.	.	.	.	.	.	.	.	.
	BENZO(A)ANTHRACENE	9	0	0	9	0	0	.	.	.	.	.	.	.	.	.
	CHRYSENE	9	0	0	9	0	0	.	.	.	.	.	.	.	.	.
	DIMETH. BENZ(A)ANTHR	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
	BENZO(E) PYRENE	9	0	0	9	0	0	.	.	.	.	.	.	.	.	.
	BENZO(B) FLUORANTHEN	9	0	0	9	0	0	.	.	.	.	.	.	.	.	.
	PERYLENE	9	0	0	9	0	0	.	.	.	.	.	.	.	.	.
	BENZO(K) FLUORANTHEN	9	0	0	9	0	0	.	.	.	.	.	.	.	.	.
	BENZO(A) PYRENE	2	0	0	2	0	0	.	.	.	.	.	.	.	.	.
	BENZO(G,H,I) PERYLEN	9	0	0	9	0	0	.	.	.	.	.	.	.	.	.
	DIBENZO(A,H) ANTHRAC	9	0	0	9	0	0	.	.	.	.	.	.	.	.	.
	INDENO(1,2,3-C,D) PY	9	0	0	9	0	0	.	.	.	.	.	.	.	.	.
	BENZO(B) CHRYSENE	9	0	0	9	0	0	.	.	.	.	.	.	.	.	.
	CORONENE	9	0	0	9	0	0	.	.	.	.	.	.	.	.	.
*TOTAL SCAN PAH		139	0	0	139	0	0	0	0	0	0	0	0	0	0	0
PESTICIDES & PCB	ALDRIN	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	ALPHA BHC	9	0	0	9	0	1	8	0	0	1	0	0	8	0	0
	BETA BHC	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	LINDANE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY

SUMMARY TABLE OF RESULTS (1989)

SCAN	PARAMETER	SITE RAW TOTAL	RAW POSITIVE	RAW TRACE	TREATED TOTAL	TREATED POSITIVE	TREATED TRACE	SITE 1 TOTAL	SITE 1 POSITIVE	SITE 1 TRACE	SITE 3 TOTAL	SITE 3 POSITIVE	SITE 3 TRACE	SITE 2 TOTAL	SITE 2 POSITIVE	SITE 2 TRACE
PESTICIDES & PCB	ALPHA CHLORDANE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	GAMMA CHLORDANE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	DIELDRIN	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	METHOXYCHLOR	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	ENDOSULFAN 1	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	ENDOSULFAN II	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	ENDRIN	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	ENDOSULFAN SULPHATE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	HEPTACHLOR EPOXIDE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	HEPTACHLOR	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	MIREX	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	OXYCHLORDANE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	OPDDT	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	PCB	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	DDD	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	PPDDE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	PPDDT	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	AMETRINE	9	0	0	9	0	0	4	0	0	.	.	.	4	0	0
	ATRAZINE	9	0	2	9	1	1	4	1	1	.	.	.	4	1	1
	ATRATONE	9	0	0	9	0	0	4	0	0	.	.	.	4	0	0
	CYANAZINE	9	0	1	9	0	1	4	0	1	.	.	.	4	0	1
	D-ETHYL ATRAZINE	9	0	0	9	0	0	4	0	0	.	.	.	4	0	0
	DES ETHYL SIMAZINE	9	0	0	9	0	0	4	0	0	.	.	.	4	0	0
	PROMETONE	9	0	0	9	0	0	4	0	0	.	.	.	4	0	0
	PROPAZINE	9	0	0	9	0	0	4	0	0	.	.	.	4	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY

SUMMARY TABLE OF RESULTS (1989)

		SITE														
		RAW			TREATED			SITE 1			SITE 3			SITE 2		
SCAN	PARAMETER	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
PESTICIDES & PCB	PROMETRYNE	9	0	0	9	0	0	4	0	0	.	.	.	4	0	0
	METRIBUZIN (SENCOR)	9	0	0	9	0	0	4	0	0	.	.	.	4	0	0
	SIMAZINE	9	0	0	9	0	0	4	0	0	.	.	.	4	0	0
	ALACHLOR	9	0	0	9	0	0	4	0	0	.	.	.	4	0	0
	METOLACHLOR	9	0	0	9	0	0	4	0	0	.	.	.	4	0	0
*TOTAL SCAN PESTICIDES & PCB		306	0	3	306	1	3	220	1	2	21	0	0	220	1	2
PHENOLICS	PHENOLICS	9	8	1	9	9	0	.	.	.	.	.	.	.	.	.
*TOTAL SCAN PHENOLICS		9	8	1	9	9	0	0	0	0	0	0	0	0	0	0
SPECIFIC PESTICIDES	TOXAPHENE	9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
	2,4,5-T	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	2,4-D	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	2,4-DB	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	2,4 D PROPIONIC ACID	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	DICAMBA	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	PICHLORAM	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	SILVEX	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	DIAZINON	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	DICHLOROVOS	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	CHLORPYRIFOS	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY

SUMMARY TABLE OF RESULTS (1989)

SCAN	PARAMETER	SITE RAW TOTAL	RAW POSITIVE	RAW TRACE	TREATED TOTAL	TREATED POSITIVE	TREATED TRACE	SITE 1 TOTAL	SITE 1 POSITIVE	SITE 1 TRACE	SITE 3 TOTAL	SITE 3 POSITIVE	SITE 3 TRACE	SITE 2 TOTAL	SITE 2 POSITIVE	SITE 2 TRACE
SPECIFIC PESTICIDES	ETHION	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	AZINPHOS-METHYL	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	MALATHION	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	MEVINPHOS	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	METHYL PARATHION	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	METHYLTRITHION	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	PARATHION	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	PHORATE	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	RELDAN	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	RONNEL	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	AMINOCARB	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	BENOMYL	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	BUX	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	CARBOFURAN	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	CICP	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	DIALLATE	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	EPTAM	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	IPC	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	PROPOXUR	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	CARBARYL	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
	BUTYLATE	0	0	0	0	0	0	.	.	.	.	.	.	.	.	.
*TOTAL SCAN SPECIFIC PESTICIDES		9	0	0	9	0	0	8	0	0	1	0	0	8	0	0
VOLATILES	BENZENE	8	0	3	9	4	2	8	2	4	1	0	0	7	1	3

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY

SUMMARY TABLE OF RESULTS (1989)

		SITE														
		RAW			TREATED			SITE 1			SITE 3			SITE 2		
SCAN	PARAMETER	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
VOLATILES	TOLUENE	8	0	0	9	3	3	8	2	2	1	0	0	7	0	4
	ETHYLBENZENE	8	0	0	9	0	5	8	0	3	1	0	0	7	0	0
	P-XYLENE	8	0	0	9	0	0	8	0	0	1	0	0	7	0	0
	M-XYLENE	8	0	0	9	2	3	8	0	5	1	0	0	7	0	0
	O-XYLENE	8	0	1	9	3	3	8	0	5	1	0	0	7	0	1
	STYRENE	8	0	0	9	0	5	8	0	5	1	0	0	7	0	2
	1,1 DICHLOROETHYLENE	8	0	0	9	0	0	8	0	0	1	0	0	7	0	0
	METHYLENE CHLORIDE	8	0	0	9	0	0	8	0	0	1	0	0	7	0	0
	T1,2DICHLOROETHYLENE	8	0	0	9	0	0	8	0	0	1	0	0	7	0	0
	1,1 DICHLOROETHANE	8	0	0	9	0	0	8	0	0	1	0	0	7	0	0
	CHLOROFORM	8	0	5	9	9	0	8	8	0	1	1	0	7	7	0
	111, TRICHLOROETHANE	8	0	1	9	0	0	8	0	0	1	0	0	7	0	0
	1,2 DICHLOROETHANE	8	0	0	9	0	0	8	0	0	1	0	0	7	0	0
	CARBON TETRACHLORIDE	8	0	0	9	0	0	8	0	1	1	0	0	7	0	0
	1,2 DICHLOROPROPANE	8	0	0	9	0	0	8	0	0	1	0	0	7	0	0
	TRICHLOROETHYLENE	8	0	0	9	0	0	8	0	0	1	0	0	7	0	0
	DICHLOROBROMOMETHANE	8	0	0	9	9	0	8	8	0	1	1	0	7	7	0
	112 TRICHLOROETHANE	8	0	0	9	0	0	8	0	0	1	0	0	7	0	0
	CHLORODIBROMOMETHANE	8	0	0	9	1	8	8	0	8	1	0	1	7	1	6
	T-CHLOROETHYLENE	8	0	0	9	2	3	8	2	3	1	0	0	7	1	4
	BROMOFORM	8	0	0	9	0	0	8	0	0	1	0	0	7	0	0
	1122 T-CHLOROETHANE	8	0	0	9	0	0	8	0	0	1	0	0	7	0	0
	CHLOROBENZENE	8	0	0	9	0	0	8	0	0	1	0	0	7	0	0
	1,4 DICHLOROBENZENE	8	0	0	9	0	0	8	0	0	1	0	0	7	0	0
	1,3 DICHLOROBENZENE	8	0	0	9	0	0	8	0	0	1	0	0	7	0	0

TABLE 4

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY

SUMMARY TABLE OF RESULTS (1989)

		SITE														
		RAW			TREATED			SITE 1			SITE 3			SITE 2		
SCAN	PARAMETER	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE	TOTAL	POSITIVE	TRACE
VOLATILES	1,2 DICHLOROBENZENE	8	0	0	9	0	0	8	0	0	1	0	0	7	0	0
	ETHLYENE DIBROMIDE	8	0	0	9	0	0	8	0	0	1	0	0	7	0	0
	TOTL TRIHALOMETHANES	8	0	0	9	9	0	8	8	0	1	1	0	7	7	0
*TOTAL SCAN VOLATILES		232	0	10	261	42	32	232	30	36	29	3	1	203	24	20
*TOTAL GROUP ORGANIC		821	8	14	849	52	35	571	31	38	65	3	1	543	25	22
TOTAL		1280	357	73	1331	369	118	1353	609	164	162	65	21	1323	601	131

KEY TO TABLE 5 and 6

A ONTARIO DRINKING WATER OBJECTIVES (ODWO)
1. Maximum Acceptable Concentration (MAC)
1+. MAC for Total Trihalomethanes
1*. MAC for Bacteriological Analyses
Poor water quality is indicated when :
- total coliform counts > 0 < 5
- P/A Bottle Test is present after 48 hours
- Aeromonas organisms are detected in more than 25% of samples in a single submission or in successive submissions from the same sampling site
- Pseudomonas Aeruginosa, Staphylococcus Aureus and members of the Fecal Streptococcus group should not be detected in any sample
- Standard Plate Count should not exceed 500 organisms per ml at 35 ^{0}C within 48 hours

2. Interim Maximum Acceptable Concentration (IMAC)
3. Maximum Desirable Concentration (MDC)
4. Aesthetic or Recommended Operational Guideline
- hardness levels between 80 and 100 mg/L as calcium carbonate are considered to provide an acceptable balance between corrosion and incrustation, water supplies with a hardness >200 mg/L are considered poor and those in excess of 500 mg/L are unacceptable.

B HEALTH & WELFARE CANADA (H&W)
1. Maximum Acceptable Concentration (MAC)
2. Proposed MAC
3. Interim MAC
4. Aesthetic Objective (AO) (for xylenes, the AO is a total)

C WORLD HEALTH ORGANIZATION (WHO)
1. Guideline Value (GV)
2. Tentative GV
3. Aesthetic GV

D US ENVIRONMENTAL PROTECTION AGENCY (EPA)
1. Maximum Contaminant Level (MCL)
2. Suggested No-Adverse Effect Level (SNAEL)
3. Lifetime Health Advisory
4. EPA Ambient Water Quality Criteria

F EUROPEAN ECONOMIC COMMUNITY (EEC)
1. Health Related Guideline Level
2. Aesthetic Guideline Level
3. Maximum Admissable Concentration (MADC)

G CALIFORNIA STATE DEPARTMENT OF HEALTH-GUIDELINE VALUE

H USSR MAXIMUM PERMISSIBLE CONCENTRATION

I NEW YORK STATE AMBIENT WATER GUIDELINE

N/A NONE AVAILABLE

INTERPRETATION OF DATA

The interpretation of analytical results that are obtained from measurements near the limit of detection of the measurement process is subject to greater uncertainty than those at higher concentrations. The principle areas of concern relate to whether the substance has actually been detected, whether it has been properly identified, and whether it is an artifact of the measurement process. In other words, false positives can be caused by the instrumentation or the test procedures used, when in fact these compounds are not present in the sample.

There are several methods to treat data from such measurements:
1. Exclude the low-level data because of this uncertainty factor. However, studies of long-term environmental trends and modelling may be adversely affected by exclusion of such data.
2. Qualify these data so the user is aware of the greater uncertainty associated with their use.

For the Drinking Water Surveillance Program, measurements near the limit of detection of the measurement process are reported qualified by the code "<T". Results quantified by "W" indicate a zero measurement. These results are reported for purposes of modelling and long-term trend analysis and no significance should be attributed to a single determination of a substance below "T" (a single determination may well be a false positive). Repeat analysis or additional data are needed before it can be stated with certainty that the substance in question was truly present. On the other hand, it is less likely that repeated detection of a substance at or near the limit of detection at a specific location is solely due to an artifact in the measurement system, and more likely represents a true positive. However the average of such data is still only an estimate of the amount of substance present subject to the possible biases of the method used.

LABORATORY RESULTS, REMARK DESCRIPTIONS

.	No Sample Taken
BDL	Below Minimum Measurable Amount
<T	Greater Than Detection Limit But Not Confident (SEE INTERPRETATION OF RESULTS ABOVE)
>	Results Are Greater Than The Upper Limit
<=>	Approximate Result
!CS	No Data: Contamination Suspected
!IL	No Data: Sample Incorrectly Labelled
!IS	No Data: Insufficient Sample
!IV	No Data: Inverted Septum
!LA	No Data: Laboratory Accident
!LD	No Data: Test Queued After Sample Discarded

!NA	No Data: No Authorization To Perform Reanalysis
!NP	No Data: No Procedure
!NR	No Data: Sample Not Received
!OP	No Data: Obscured Plate
!QU	No Data: Quality Control Unacceptable
!RE	No Data: Received Empty
!RO	No Data: See Attached Report (no numeric results)
!SM	No Data: Sample Missing
!SS	No Data: Send Separate Sample Properly Preserved
!UI	No Data: Indeterminant Interference
!TX	No Data: Time Expired
A3C	Approximate, Total Count Exceeded 300 Colonies
APL	Additional Peak, Large, Not Priority Pollutant
APS	Additional Peak, Less Than, Not Priority Pollutant
CIC	Possible Contamination, Improper Cap
CRO	Calculated Result Only
PPS	Test Performed On Preserved Sample
RMP	P and M-Xylene Not Separated
RRV	Rerun Verification
RVU	Reported Value Unusual
SPS	Several Peaks, Small, Not Priority Pollutant
UAL	Unreliable: Sample Age Exceeds Normal Limit
UCR	Unreliable: Could Not Confirm By Reanalysis
UCS	Unreliable: Contamination Suspected
UIN	Unreliable: Indeterminant Interference
XP	Positive After X Number of Hours
T# (T06)	Result Taken After # Hours

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEN					
	RAW	TREATED	SITE 1		SITE 3		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
BACTERIOLOGICAL								
FECAL COLIFORM MF (CT/100ML)				DET'N LIMIT = 0	GUIDELINE = 0 (A1)			
APR	BDL	.	.	.	.	.	.	.
MAY	10	.	.	.	.	.	.	.
JUN	12	.	.	.	.	.	.	.
JUL	54 A3C	.	.	.	.	.	.	.
AUG	6 A3C	.	.	.	.	.	.	.
SEP	300	.	.	.	.	.	.	.
OCT	6	.	.	.	.	.	.	.
NOV	38	.	.	.	.	.	.	.
DEC	BDL	.	.	.	.	.	.	.
STANDRD PLATE CNT MF ( )				DET'N LIMIT =	GUIDELINE =			
APR	.	3 <=>	.	1 <=>	.	.	.	920
MAY	.	2400 >	.	790	.	.	.	190
JUN	.	3 <=>	.	3 <=>	.	.	.	90 <=>
JUL	.	4 <=>	.	4 <=>	.	.	.	10000
AUG	.	410	.	0 <=>	.	.	.	24000 >
SEP	.	1810	.	11	.	.	.	.
OCT	.	19	.	1 <=>	.	.	.	80
NOV	.	6 <=>	.	.	.	.	.	0 <=>
DEC	.	26	.	.	.	22	.	1 <=>
TOTAL COLIFORM MF (CT/100ML)				DET'N LIMIT = 0	GUIDELINE = 5/100ML(A1)			
APR	108 A3C	0	.	0	.	.	.	0
MAY	112 A3C	0	.	0	.	.	.	0 A3C

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

		WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
	SITE TYPE RAW	TREATED	SITE 1		SITE 3		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
JUN	180 <=>	0	.	0	.	.	.	0
JUL	200 A3C	0	.	0	.	.	.	BDL
AUG	2200 A3C	0	.	0	.	.	.	3 A3C
SEP	1200 A3C	BDL	.	0	.	.	.	.
OCT	250 A3C	0	.	0	.	.	.	0
NOV	6100 A3C	0	.	.	.	.	.	0
DEC	460 A3C	0	.	.	.	0	.	0
T COLIFORM BCKGRD NF (CT/100ML)				DET'N LIMIT = 0	GUIDELINE = N/A			
APR	4800 >	0	.	0	.	.	.	0
MAY	9600 >	82	.	0	.	.	.	1200 A3C
JUN	14000 A3C	0	.	0	.	.	.	10
JUL	42000 A3C	0	.	0	.	.	.	40000 >
AUG	68000 A3C	0	.	0	.	.	.	2400 >
SEP	30000 A3C	24000 >	.	0	.	.	.	.
OCT	6400 A3C	2	.	0	.	.	.	2
NOV	26000 A3C	0	.	.	.	.	.	0
DEC	3700 A3C	0	.	.	.	0	.	0

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE TYPE	WATER TREATMENT PLANT RAW	WATER TREATMENT PLANT TREATED	DISTRIBUTION SYSTEM SITE 1 STANDING	DISTRIBUTION SYSTEM SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 3 STANDING	DISTRIBUTION SYSTEM SITE 3 FREE FLOW	DISTRIBUTION SYSTEM SITE 2 STANDING	DISTRIBUTION SYSTEM SITE 2 FREE FLOW
CHEMISTRY (FLD)								
FLD CHLORINE (COMB) ( )				DET'N LIMIT =	GUIDELINE =			
APR	.	.500	.	.400	.	.	.	.050
MAY	.	.300	.400	.600	.	.	.050	.050
JUN	.	.200	.300	.600	.	.	.000	.000
JUL	.	.000	.300	1.000	.	.	.000	.300
AUG	.	.200	.300	.700	.	.	.100	.300
SEP	.	.000	.600	.200	.	.	.	.
OCT	.	.200	.300	.400	.	.	.100	.350
NOV	.	.700	.400	.400	.	.	.200	.100
DEC	.	.200	.	.	.400	.900	.200	.500
FLD CHLORINE FREE ( )				DET'N LIMIT =	GUIDELINE =			
APR	.	1.100	.	1.300	.	.	.	.
MAY	.	1.600	.	.400	.	.	.	.
JUN	.000	1.700	.100	.900	.	.	.000	.000
JUL	.	1.900	.100	.500	.	.	.000	.000
AUG	.	1.700	.000	.900	.	.	.000	.000
SEP	.	1.900	.700	1.700	.	.	.	.
OCT	.	1.800	.000	1.500	.	.	.000	.050
NOV	.	.900	.000	.200	.	.	.000	.200
DEC	.	1.700	.	.	.500	.600	.000	.400
FLD CHLORINE (TOTAL) ( )				DET'N LIMIT =	GUIDELINE =			
APR	.	1.600	.	1.700	.	.	.	.050
MAY	.	1.900	.400	1.000	.	.	.050	.050

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

		WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	RAW	TREATED	SITE 1		SITE 3		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
JUN	.	1.900	.400	1.500	.	.	.000	.000
JUL	.	1.900	.400	1.500	.	.	.000	.300
AUG	.	1.900	.300	1.600	.	.	.100	.300
SEP	.	1.900	1.300	1.900	.	.	.	.
OCT	.	2.000	.300	1.900	.	.	.100	.400
NOV	.	1.600	.400	.600	.	.	.200	.300
DEC	.	1.900	.	.	.900	1.500	.200	.900
FLD PH (DIMNSLESS)				DET'N LIMIT = N/A	GUIDELINE = 6.5-8.5(A4)			
APR	7.900	7.200	7.200	7.200	.	.	7.200	7.100
MAY	7.800	7.000	7.100	6.900	.	.	7.100	7.100
JUN	7.700	7.000	7.000	6.800	.	.	7.200	7.100
JUL	7.800	7.000	7.100	6.900	.	.	7.100	7.000
AUG	7.700	6.900	7.300	6.800	.	.	7.100	6.900
SEP	7.700	6.900	6.800	6.800	.	.	.	.
OCT	7.700	7.100	7.000	6.900	.	.	7.200	7.000
NOV	7.400	6.900	6.900	6.800	.	.	6.900	6.800
DEC	7.400	7.100	.	.	7.000	7.200	7.000	7.000
FLD TEMPERATURE (DEG.C)				DET'N LIMIT = N/A	GUIDELINE = 15 (A1)			
APR	9.500	9.500	15.000	7.500	.	.	17.000	4.500
MAY	18.500	19.000	16.500	14.000	.	.	19.500	18.500
JUN	26.500	27.000	21.000	21.500	.	.	19.000	12.000
JUL	25.000	25.000	22.000	23.000	.	.	20.500	19.000
AUG	20.100	20.100	21.000	20.500	.	.	19.000	18.000
SEP	16.500	16.500	18.000	17.500	.	.	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
SITE			SITE 1		SITE 3		SITE 2	
TYPE	RAW	TREATED	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
OCT	8.000	6.500	16.000	10.000	.	.	22.000	15.000
NOV	3.500	20.000	14.000	7.000	.	.	19.000	12.500
DEC	1.000	2.000	.	.	17.000	6.500	21.000	11.000
FLD TURBIDITY (FTU)			DET'N LIMIT = N/A		GUIDELINE = 1.0 (A1)			
APR	2.260	.270	.300	.330	.	.	1.680	2.150
MAY	4.800	.480	.820	.720	.	.	1.690	1.350
JUN	7.200	.500	.470	.590	.	.	3.500	3.700
JUL	10.420	.	1.120	1.170	.	.	1.500	.950
AUG	6.500	.	.930	.670	.	.	.850	.750
SEP	17.840	.	.800	.650	.	.	.	.
OCT	3.300	.720	.820	.690	.	.	.920	.790
NOV	6.750	1.280	.	.	.	.	.	.
DEC	.	.810	.	.	.	.	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
SITE			SITE 1		SITE 3		SITE 2	
TYPE	RAW	TREATED	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
CHEMISTRY (LAB)								
ALKALINITY (MG/L)				DET'N LIMIT = .200	GUIDELINE = 30-500 (A4)			
APR	197.700	161.900	168.900	162.200	.	.	146.900	150.300
MAY	162.600	127.500	126.700	125.200	.	.	115.400	116.100
JUN	159.500	122.800	121.200	115.300	.	.	120.000	121.200
JUL	172.900	134.400	134.800	129.700	.	.	132.900	132.100
AUG	138.300	103.600	107.700	102.000	.	.	104.200	106.000
SEP	134.800	97.900	103.400	101.600	.	.	.	.
OCT	142.300	108.600	107.300	108.500	.	.	108.600	107.000
NOV	160.600	112.600	113.300	116.500	.	.	113.500	112.500
DEC	167.300	123.600	.	.	123.400	124.600	126.000	125.100
CALCIUM (MG/L)				DET'N LIMIT = .100	GUIDELINE = 100 (F2)			
APR	85.600	84.800	81.600	85.000	.	.	82.200	82.600
MAY	65.400	65.600	66.600	66.800	.	.	60.600	60.800
JUN	56.400	59.200	59.800	58.200	.	.	57.000	55.600
JUL	58.800	57.600	58.800	59.000	.	.	58.000	59.000
AUG	52.000	51.200	52.400	53.000	.	.	52.000	52.800
SEP	52.600	53.000	52.800	54.000	.	.	.	.
OCT	52.000	51.200	51.400	51.200	.	.	52.800	51.000
NOV	70.600	70.400	71.500	72.600	.	.	70.400	69.400
DEC	67.600	67.600	.	.	66.600	68.200	66.600	67.000
CYANIDE (MG/L)				DET'N LIMIT = 0.001	GUIDELINE = .200 (A1)			
APR	BDL	BDL	.	BDL	.	.	.	BDL
MAY	BDL	BDL	.	BDL	.	.	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
SITE			SITE 1		SITE 3		SITE 2	
TYPE	RAW	TREATED	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
JUN	BDL	BDL	.	BDL	.	.	.	BDL
JUL	BDL	BDL	.	BDL	.	.	.	BDL
AUG	BDL	BDL	.	BDL	.	.	.	BDL
SEP	BDL	BDL	.	BDL	.	.	.	.
OCT	BDL	BDL	.	BDL	.	.	.	BDL
NOV	BDL	BDL	.	BDL	.	.	.	BDL
DEC	BDL	BDL	.	.	.	BDL	.	BDL
CHLORIDE (MG/L)				DET'N LIMIT = .200	GUIDELINE = 250 (A3)			
APR	23.500	26.700	26.900	27.200	.	.	25.700	25.700
MAY	18.500	22.800	24.100	23.200	.	.	23.400	23.300
JUN	17.200	23.000	23.800	23.600	.	.	24.800	24.300
JUL	20.300	27.200	27.300	27.100	.	.	27.000	26.800
AUG	17.800	21.700	21.900	22.400	.	.	22.000	22.200
SEP	19.300	25.300	26.300	26.000	.	.	.	.
OCT	19.700	22.900	23.700	24.300	.	.	23.200	23.100
NOV	22.800	24.900	25.800	24.900	.	.	26.200	25.400
DEC	24.500	29.300	.	.	29.600	28.900	29.300	29.000
COLOUR (HZU)				DET'N LIMIT = .5	GUIDELINE = 5.0 (A3)			
APR	33.500	7.500	10.000	6.500	.	.	20.000	28.000
MAY	35.500	6.500	8.500	8.000	.	.	22.500	26.500
JUN	37.500	9.500	11.000	9.000	.	.	34.500	46.500
JUL	40.000	9.500	12.000	9.500	.	.	12.500	14.000
AUG	38.000	9.000	12.000	9.000	.	.	12.000	12.000
SEP	28.500	5.000	6.500	4.500	.	.	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE TYPE	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
	RAW	TREATED	SITE 1		SITE 3		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
OCT	27.000	6.500	9.500	7.000	.	.	8.500	10.000
NOV	36.500	7.000	10.500	8.500	.	.	7.500	10.000
DEC	17.500	4.000	.	.	6.000	4.500	7.000	6.500
CONDUCTIVITY (UMHO/CM)				DET'N LIMIT = 1	GUIDELINE = 400 (F2)			
APR	519	535	533	540	.	.	513	518
MAY	407	424	436	435	.	.	411	410
JUN	382	407	409	410	.	.	410	408
JUL	405	428	431	430	.	.	423	422
AUG	359	384	387	389	.	.	387	383
SEP	355	385	399	395	.	.	.	.
OCT	368	390	385	385	.	.	391	384
NOV	441	468	475	466	.	.	474	468
DEC	443	468	.	.	468	466	472	464
FLUORIDE (MG/L)				DET'N LIMIT = .01	GUIDELINE = 2.400 (A1)			
APR	.060	.040 <T	.040 <T	.040 <T	.	.	.040 <T	.040 <T
MAY	.060	.060	.040 <T	.060	.	.	.040 <T	.020 <T
JUN	.080	.060	.060	.060	.	.	.060	.060
JUL	.080	.060	.060	.060	.	.	.060	.060
AUG	.100	.060	.060	.060	.	.	.060	.060
SEP	.060	.040 <T	.040 <T	.040 <T	.	.	.	.
OCT	.060	.020 <T	.020 <T	.040 <T	.	.	.040 <T	.040 <T
NOV	.180	.020 <T	.040 <T	.040 <T	.	.	.040 <T	.040 <T
DEC	.080	.100	.	.	.040 <T	BDL	.060	.100

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
SITE			SITE 1		SITE 3		SITE 2	
TYPE	RAW	TREATED	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
HARDNESS (MG/L)				DET'N LIMIT = .500	GUIDELINE = 80-100 (A4)			
APR	248.000	246.000	238.000	246.000	.	.	239.000	239.000
MAY	196.000	197.000	200.000	200.000	.	.	183.000	184.000
JUN	174.000	181.000	183.000	179.000	.	.	176.000	174.000
JUL	187.000	183.000	187.000	187.000	.	.	185.000	187.000
AUG	169.000	167.000	170.000	172.000	.	.	169.000	171.000
SEP	171.000	172.000	173.000	176.000	.	.	.	.
OCT	169.000	166.000	166.000	166.000	.	.	171.000	166.000
NOV	210.000	211.000	214.000	216.000	.	.	210.000	208.000
DEC	210.000	210.000	.	.	208.000	212.000	208.000	209.000
IONCAL (DMNSLESS)				DET'N LIMIT = N/A	GUIDELINE = N/A			
APR	.000 NAF	1.934	3.624	2.117	.	.	1.932	.692
MAY	1.066	.798	.111	.019	.	.	.905	.393
JUN	3.849	2.240	.584	1.903	.	.	3.565	4.683
JUL	3.856	4.725	3.278	2.580	.	.	2.643	1.977
AUG	.186	1.841	1.364	.448	.	.	1.706	.028
SEP	4.815	2.491	1.311	2.345	.	.	.	.
OCT	1.415	3.115	1.433	1.035	.	.	.614	1.845
NOV	.492	.775	.068	2.211	.	.	.937	1.505
DEC	1.511	1.524	.	.	.659	2.646	.996	.973
LANGELIERS INDEX (DMNSLESS)				DET'N LIMIT = N/A	GUIDELINE = N/A			
APR	1.316	1.253	1.155	1.235	.	.	1.060	.991
MAY	.855	.669	.552	.478	.	.	.383	.387
JUN	.795	.520	.508	.375	.	.	.363	.417

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE TYPE	RAW	TREATED	WATER TREATMENT PLANT SITE 1		DISTRIBUTION SYSTEM SITE 3		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
JUL	1.086	.885	.855	.820	.	.	.864	.899
AUG	.600	-.015	.022	-.147	.	.	-.016	-.091
SEP	.684	.455	.406	.409	.	.	.	.
OCT	.721	.455	.362	.505	.	.	.518	.427
NOV	.949	.531	.140	.010	.	.	.324	.715
DEC	.858	.454	.	.	.557	.382	.376	.656
MAGNESIUM (MG/L)				DET'N LIMIT = .050 GUIDELINE = 30 (F2)				
APR	8.400	8.200	8.300	8.200	.	.	8.200	7.800
MAY	7.900	8.000	8.100	8.000	.	.	7.700	7.700
JUN	8.000	8.000	8.200	8.200	.	.	8.300	8.600
JUL	9.600	9.400	9.700	9.600	.	.	9.800	9.600
AUG	9.500	9.400	9.500	9.500	.	.	9.500	9.500
SEP	9.600	9.600	9.900	9.900	.	.	.	.
OCT	9.400	9.400	9.200	9.300	.	.	9.500	9.400
NOV	8.300	8.700	8.400	8.300	.	.	8.300	8.400
DEC	10.000	10.000	.	.	10.000	10.200	10.200	10.200
SODIUM (MG/L)				DET'N LIMIT = .200 GUIDELINE = 200 (C3)				
APR	10.000	10.600	10.800	10.800	.	.	10.400	10.600
MAY	8.800	9.800	10.400	10.000	.	.	10.000	9.800
JUN	8.800	9.800	10.000	10.200	.	.	10.600	10.400
JUL	9.800	11.200	11.600	11.600	.	.	11.400	11.200
AUG	8.600	10.200	10.000	10.200	.	.	10.200	10.000
SEP	9.400	10.600	12.200	11.400	.	.	.	.
OCT	9.600	11.200	11.400	11.600	.	.	11.400	11.200

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

		WATER TREATMENT PLANT			DISTRIBUTION SYSTEM			
SITE TYPE	RAW	TREATED	SITE 1		SITE 3		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
NOV	9.800	12.400	12.200	12.000	.	.	12.000	12.200
DEC	11.800	13.600	.	.	13.800	13.400	13.200	13.200
AMMONIUM TOTAL (MG/L)			DET'N LIMIT = 0.002 GUIDELINE = .05 (F2)					
APR	.052	BDL	.024	.006 <T	.	.	.036	.024
MAY	.124	.010	.388	.016	.	.	.080	.032
JUN	.170	.016	.024	.020	.	.	.028	.026
JUL	.094	.006 <T	.054	.008 <T	.	.	.084	.024
AUG	.042	.010	.024	.010	.	.	.066	.024
SEP	BDL	.006 <T	.102	.002 <T	.	.	.	.
OCT	BDL	BDL	.060	.008 <T	.	.	.178	.026
NOV	.072	.004 <T	.044	.004 <T	.	.	.148	.004 <T
DEC	.178	BDL	.	.	.076	BDL	.198	.004 <T
NITRITE (MG/L)			DET'N LIMIT = 0.001 GUIDELINE = 1.000 (A1)					
APR	.015	.004 <T	.005	.004 <T	.	.	.007	.008
MAY	.013	.002 <T	.003 <T	.003 <T	.	.	.005	.004 <T
JUN	.018	.002 <T	.004 <T	.002 <T	.	.	.004 <T	.005
JUL	.005	.004 <T	.005	.004 <T	.	.	.006	.005
AUG	.004 <T	.003 <T	.004 <T	.003 <T	.	.	.005	.004 <T
SEP	.077	.002 <T	.004 <T	.002 <T	.	.	.	.
OCT	.003 <T	.001 <T	.004 <T	.001 <T	.	.	.002 <T	.004 <T
NOV	.013	.002 <T	.004 <T	.002 <T	.	.	.003 <T	.004 <T
DEC	.009	.001 <T	.	.	.002 <T	.001 <T	.001 <T	.002 <T
TOTAL NITRATES (MG/L)			DET'N LIMIT = .020 GUIDELINE = 10.000 (A1)					

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE TYPE	WATER TREATMENT PLANT RAW	WATER TREATMENT PLANT TREATED	DISTRIBUTION SYSTEM SITE 1 STANDING	DISTRIBUTION SYSTEM SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 3 STANDING	DISTRIBUTION SYSTEM SITE 3 FREE FLOW	DISTRIBUTION SYSTEM SITE 2 STANDING	DISTRIBUTION SYSTEM SITE 2 FREE FLOW
APR	1.300	1.310	1.230	1.270	.	.	1.350	1.280
MAY	.285	.280	.310	.290	.	.	.865	.245
JUN	.165	.245	.230	.170	.	.	.410	.155
JUL	BDL	BDL	.005 <T	BDL	.	.	.155	BDL
AUG	BDL	BDL	BDL	BDL	.	.	.245	BDL
SEP	.125	.045	.085	.040	.	.	.	.
OCT	.135	.110	.125	.105	.	.	.370	.105
NOV	1.460	1.420	1.470	1.470	.	.	1.710	1.430
DEC	.905	.885	.	.	.970	.890	1.260	1.010
NITROGEN TOT KJELD (MG/L)			DET'N LIMIT = .020 GUIDELINE = N/A					
APR	.860	.510	.720	.480	.	.	.540	.500
MAY	1.120	.600	.900	.610	.	.	.760	.580
JUN	1.170	.620	.860	.610	.	.	.660	.530
JUL	1.630	.730	.930	.710	.	.	.800	.730
AUG	1.030	.640	.750	.690	.	.	.700	.660
SEP	1.270	.480	1.030	.510	.	.	.	.
OCT	.870	.510	.820	.540	.	.	.830	.550
NOV	1.050	.650	.680	.530	.	.	.820	.640
DEC	1.160	.590	.	.	.780	.570	.830	.610
PH (DIMENSLESS)			DET'N LIMIT = N/A	GUIDELINE = 6.5-8.5(A4)				
APR	8.550	8.580	8.480	8.560	.	.	8.440	8.360
MAY	8.280	8.200	8.080	8.010	.	.	7.990	7.990
JUN	8.290	8.110	8.100	8.000	.	.	7.980	8.040
JUL	8.530	8.450	8.410	8.390	.	.	8.430	8.460

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE TYPE	WATER TREATMENT PLANT RAW	WATER TREATMENT PLANT TREATED	DISTRIBUTION SYSTEM SITE 1 STANDING	DISTRIBUTION SYSTEM SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 3 STANDING	DISTRIBUTION SYSTEM SITE 3 FREE FLOW	DISTRIBUTION SYSTEM SITE 2 STANDING	DISTRIBUTION SYSTEM SITE 2 FREE FLOW
AUG	8.190	7.710	7.720	7.570	.	.	7.700	7.610
SEP	8.280	8.190	8.120	8.120	.	.	.	.
OCT	8.300	8.160	8.070	8.210	.	.	8.210	8.140
NOV	8.350	8.090	7.690	7.540	.	.	7.880	8.280
DEC	8.260	7.990	.	.	8.100	7.910	7.910	8.190
PHOSPHORUS FIL REACT (MG/L)			DET'N LIMIT = .0005 GUIDELINE = N/A					
APR	.000 <T	BDL	.	.	.	.	.	.
MAY	.001 <T	BDL	.	.	.	.	.	.
JUN	.001 <T	BDL	.	.	.	.	.	.
JUL	.003	BDL	.	.	.	.	.	.
AUG	.002 <T	.001 <T	.	.	.	.	.	.
SEP	.003	BDL	.	.	.	.	.	.
OCT	BDL	BDL	.	.	.	.	.	.
NOV	.003	.001 <T	.	.	.	.	.	.
DEC	.003	.000 <T	.	.	.	.	.	.
PHOSPHORUS TOTAL (MG/L)			DET'N LIMIT = .002 GUIDELINE = .40 (F2)					
APR	.024	.006 <T	.	.	.	.	.	.
MAY	.038	.008 <T	.	.	.	.	.	.
JUN	.041	.010	.	.	.	.	.	.
JUL	.083	.010	.	.	.	.	.	.
AUG	.054	.014	.	.	.	.	.	.
SEP	.099	.016	.	.	.	.	.	.
OCT	.030	.006 <T	.	.	.	.	.	.
NOV	.022	.005 <T	.	.	.	.	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
SITE TYPE	RAW	TREATED	SITE 1		SITE 3		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
DEC	.019	.004 <T	.	.	.	.	.	.
SULPHATE (MG/L)			DET'N LIMIT = .200 GUIDELINE = 500. (A3)					
APR	32.530	66.550	57.210	67.140	.	.	65.940	65.730
MAY	22.410	53.400	58.530	59.990	.	.	53.150	53.630
JUN	15.870	48.460	48.440	53.690	.	.	48.270	48.090
JUL	13.760	42.030	43.860	47.550	.	.	42.390	43.610
AUG	23.700	55.690	53.560	58.490	.	.	56.170	53.290
SEP	19.170	54.120	53.810	55.030	.	.	.	.
OCT	20.590	53.270	50.630	48.140	.	.	52.670	51.830
NOV	33.690	80.540	81.290	76.270	.	.	78.910	81.040
DEC	26.480	65.100	.	.	64.820	63.960	65.480	63.390
TURBIDITY (FTU)			DET'N LIMIT = .02 GUIDELINE = 1.00 (A1)					
APR	5.200	.840	.300	.400	.	.	1.680 RRV	2.150 RRV
MAY	8.600	.470	1.320 RRV	.800	.	.	2.100 RRV	2.300 RRV
JUN	9.000	.550	.880	.520	.	.	7.000	7.800
JUL	31.000	.980	3.200 RRV	1.310 RRV	.	.	1.250 RRV	1.250 RRV
AUG	16.400	.830	1.500 RRV	1.360 RRV	.	.	.930	1.650 RRV
SEP	33.000	.970	1.430	.830	.	.	.	.
OCT	5.800	1.300	1.700	.950	.	.	1.400	1.800
NOV	7.900	2.600	2.600	1.570	.	.	2.000	2.700
DEC	4.200	2.600 RRV	.	.	2.100 RRV	1.690 RRV	1.690 RRV	3.200 RRV

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE TYPE	RAW	TREATED	WATER TREATMENT PLANT SITE 1 STANDING	SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 3 STANDING	SITE 3 FREE FLOW	SITE 2 STANDING	SITE 2 FREE FLOW
METALS								
SILVER (UG/L)				DET'N LIMIT = .020 GUIDELINE = 50. (A1)				
APR	.060 <T	.030 <T	.070 <T	BDL	.	.	BDL	BDL
MAY	BDL	BDL	BDL	BDL	.	.	BDL	BDL
JUN	BDL	BDL	.030 <T	BDL	.	.	BDL	BDL
JUL	BDL	BDL	.040 <T	BDL	.	.	BDL	BDL
AUG	BDL	BDL	BDL	BDL	.	.	BDL	BDL
SEP	BDL	BDL	BDL	BDL	.	.	.	.
OCT	BDL	BDL	.030 <T	BDL	.	.	BDL	BDL
NOV	BDL	BDL	BDL	BDL	.	.	.030 <T	BDL
DEC	BDL	BDL	.	.	BDL	BDL	BDL	BDL
ALUMINUM (UG/L)				DET'N LIMIT = .050 GUIDELINE = 100.(A4)				
APR	71.920	49.880	53.360	38.280	.	.	60.320	26.680
MAY	150.000	180.000	430.000	540.000	.	.	470.000	340.000
JUN	60.000	140.000	120.000	130.000	.	.	180.000	100.000
JUL	220.000	190.000	250.000	220.000	.	.	170.000	170.000
AUG	140.000	270.000	320.000	220.000	.	.	160.000	200.000
SEP	380.000	200.000	190.000	200.000	.	.	.	.
OCT	100.000	4.800	590.000	470.000	.	.	510.000	670.000
NOV	64.000	750.000	800.000	880.000	.	.	520.000	700.000
DEC	31.000	680.000	.	.	830.000	920.000	580.000	620.000
ARSENIC (UG/L)				DET'N LIMIT = 0.050 GUIDELINE = 50.0 (A1)				
APR	.690 <T	.450 <T	.520 <T	1.000 <T	.	.	.590 <T	.550 <T
MAY	.680 <T	.710 <T	.240 <T	.310 <T	.	.	.160 <T	.310 <T

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
SITE TYPE	RAW	TREATED	SITE 1		SITE 3		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
JUN	1.100	.820 <T	1.100	.870 <T	.	.	.750 <T	.820 <T
JUL	1.400	.950 <T	1.100	.870 <T	.	.	.870 <T	.880 <T
AUG	1.500	1.100	1.200	1.100	.	.	1.300	1.100
SEP	1.000 <T	.630 <T	.600 <T	.610 <T	.	.	.	.
OCT	.060 <T	BDL	.780 <T	BDL	.	.	BDL	BDL
NOV	.940 <T	.890 <T	1.500	.780 <T	.	.	.430 <T	.410 <T
DEC	.530 <T	.330 <T	.	.	.460 <T	.430 <T	.410 <T	.670 <T
BARIUM (UG/L)			DET'N LIMIT = 0.020 GUIDELINE = 1000. (A1)					
APR	38.000	30.000	30.000	31.000	.	.	34.000	29.000
MAY	34.000	29.000	32.000	31.000	.	.	34.000	32.000
JUN	36.000	35.000	36.000	36.000	.	.	44.000	45.000
JUL	46.000	40.000	40.000	40.000	.	.	37.000	40.000
AUG	37.000	31.000	31.000	32.000	.	.	31.000	31.000
SEP	36.000	28.000	30.000	29.000	.	.	.	.
OCT	33.000	3.500	27.000	25.000	.	.	27.000	25.000
NOV	34.000	30.000	32.000	31.000	.	.	30.000	30.000
DEC	35.000	29.000	.	.	31.000	29.000	29.000	28.000
BORON (UG/L)			DET'N LIMIT = 0.200 GUIDELINE = 5000. (A1)					
APR	320.000	32.000	33.000	300.000	.	.	57.000	37.000
MAY	43.000	27.000	25.000	40.000	.	.	16.000 <T	45.000
JUN	16.000 <T	30.000	38.000	34.000	.	.	35.000	33.000
JUL	41.000	34.000	41.000	37.000	.	.	40.000	42.000
AUG	44.000	42.000	35.000	42.000	.	.	46.000	47.000
SEP	47.000	44.000	49.000	45.000	.	.	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
SITE TYPE	RAW	TREATED	SITE 1		SITE 3		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
OCT	12.000 <T	13.000 <T	16.000 <T	14.000 <T	.	.	12.000 <T	11.000 <T
NOV	18.000 <T	16.000 <T	28.000	27.000	.	.	21.000	12.000 <T
DEC	16.000 <T	14.000 <T	.	.	19.000 <T	25.000	13.000 <T	26.000
BERYLLIUM (UG/L)			DET'N LIMIT = 0.010 GUIDELINE = N/A					
APR	.470 <T	.120 <T	BDL	.310 <T	.	.	.130 <T	BDL
MAY	.140 <T	.090 <T	.110 <T	.150 <T	.	.	BDL	BDL
JUN	BDL	.040 <T	BDL	.060 <T	.	.	.120 <T	.060 <T
JUL	.190 <T	.070 <T	.060 <T	.080 <T	.	.	.080 <T	.050 <T
AUG	.170 <T	.080 <T	.030 <T	.040 <T	.	.	.110 <T	.110 <T
SEP	.090 <T	.020 <T	.030 <T	.050 <T	.	.	.	.
OCT	.020 <T	BDL	.040 <T	.030 <T	.	.	.020 <T	.020 <T
NOV	BDL	BDL	.040 <T	.040 <T	.	.	.030 <T	BDL
DEC	BDL	BDL	.	.	BDL	BDL	BDL	BDL
CADMIUM (UG/L)			DET'N LIMIT = 0.050 GUIDELINE = 5.000 (A1)					
APR	.190 <T	BDL	.120 <T	BDL	.	.	BDL	BDL
MAY	.670	BDL	.950	BDL	.	.	.150 <T	.080 <T
JUN	BDL	.070 <T	.430 <T	BDL	.	.	.120 <T	BDL
JUL	.110 <T	.240 <T	.960	.130 <T	.	.	.190 <T	.090 <T
AUG	BDL	BDL	.280 <T	BDL	.	.	BDL	BDL
SEP	BDL	BDL	.160 <T	BDL	.	.	.	.
OCT	BDL	BDL	.280 <T	BDL	.	.	.080 <T	BDL
NOV	.160 <T	BDL	.350 <T	.070 <T	.	.	BDL	BDL
DEC	.190 <T	BDL	.	.	.230 <T	BDL	.100 <T	BDL

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DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
TYPE	RAW	TREATED	SITE 1		SITE 3		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
COBALT (UG/L)			DET'N LIMIT = 0.020 GUIDELINE = N/A					
APR	.160 <T	.080 <T	.070 <T	.100 <T	.	.	.380 <T	.130 <T
MAY	.420 <T	.270 <T	.380 <T	.260 <T	.	.	.990 <T	.440 <T
JUN	.640 <T	.520 <T	.650 <T	.570 <T	.	.	1.100	.910 <T
JUL	.190 <T	.070 <T	.130 <T	.050 <T	.	.	.120 <T	.050 <T
AUG	.190 <T	.260 <T	.180 <T	.120 <T	.	.	.390 <T	.060 <T
SEP	.200 <T	.080 <T	.050 <T	BDL	.	.	.	.
OCT	.080 <T	.070 <T	.060 <T	.030 <T	.	.	1.400	BDL
NOV	BDL	BDL	.250 <T	.090 <T	.	.	.310 <T	.070 <T
DEC	.180 <T	.130 <T	.	.	.170 <T	.130 <T	.100 <T	.120 <T
CHROMIUM (UG/L)			DET'N LIMIT = 0.100 GUIDELINE = 50. (A1)					
APR	11.000	.900 <T	1.000 <T	13.000	.	.	4.000	1.500
MAY	13.000	6.200	5.100	11.000	.	.	4.900	14.000
JUN	.460 <T	5.100	3.100	6.100	.	.	6.800	6.200
JUL	8.400	6.200	7.600	7.200	.	.	7.900	8.500
AUG	6.200	5.500	4.200	5.900	.	.	12.000	6.500
SEP	7.300	6.400	5.900	6.400	.	.	.	.
OCT	.440 <T	.850 <T	2.000	.940 <T	.	.	1.300	.990 <T
NOV	.930 <T	1.200	2.000	3.800	.	.	.970 <T	.560 <T
DEC	.570 <T	.970 <T	.	.	.860 <T	4.500 <T	1.000 <T	4.800 <T
COPPER (UG/L)			DET'N LIMIT = .100 GUIDELINE = 1000 (A3)					
APR	4.800	1.700	160.000	9.300	.	.	52.000	21.000
MAY	13.000	1.800	210.000	10.000	.	.	51.000	24.000
JUN	.950 <T	2.300	180.000	12.000	.	.	45.000	21.000

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
SITE			SITE 1		SITE 3		SITE 2	
TYPE	RAW	TREATED	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
JUL	1.700	2.800	230.000	13.000	.	.	100.000	87.000
AUG	1.900	2.000	230.000	13.000	.	.	160.000	120.000
SEP	2.700	1.600	180.000	15.000	.	.	.	.
OCT	.970 <T	5.700	140.000	8.300	.	.	140.000	110.000
NOV	1.200	1.300	270.000	9.300	.	.	170.000	140.000
DEC	7.600	1.700 <T	.	.	230.000	17.000	160.000	120.000
IRON (UG/L)			DET'N LIMIT = 4.000 GUIDELINE = 300. (A3)					
APR	85.000	BDL	16.000 <T	BDL	.	.	520.000	840.000
MAY	120.000	BDL	29.000 <T	35.000 <T	.	.	870.000	840.000
JUN	100.000	12.000 <T	31.000 <T	25.000 <T	.	.	1500.000	1800.000
JUL	350.000	19.000 <T	47.000 <T	26.000 <T	.	.	75.000	150.000
AUG	210.000	5.500 <T	26.000 <T	9.200 <T	.	.	100.000	70.000
SEP	420.000	11.000 <T	29.000 <T	38.000 <T	.	.	.	.
OCT	110.000	BDL	84.000	27.000 <T	.	.	96.000	160.000
NOV	79.000	76.000	160.000	84.000	.	.	80.000	210.000
DEC	33.000 <T	18.000 <T	.	.	37.000 <T	35.000 <T	47.000 <T	99.000
MERCURY (UG/L)			DET'N LIMIT = 0.010 GUIDELINE = 1.000 (A1)					
APR	.060	BDL	.	BDL	.	.	.	BDL
MAY	.080	.020 <T	.	.020 <T	.	.	.	BDL
JUN	.040 <T	.030 <T	.	.040 <T	.	.	.	BDL
JUL	.080	.070	.	.060	.	.	.	BDL
AUG	.130	.110	.	.100	.	.	.	.020 <T
SEP	.170	.220	.	.100	.	.	.	.
OCT	BDL	.160	.	.140	.	.	.	.020 <T

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DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
			SITE 1		SITE 3		SITE 2	
TYPE	RAW	TREATED	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
NOV	.020 <T	BDL	.	.260	.	.	.	.060
DEC	.060	BDL	.	.	.	.320	.	.040 <T
MANGANESE (UG/L)				DET'N LIMIT = .050 GUIDELINE = 50.0 (A3)				
APR	17.000	12.000	4.000	5.800	.	.	65.000	130.000
MAY	56.000	12.000	9.400	13.000	.	.	60.000	75.000
JUN	38.000	13.000	7.900	8.500	.	.	420.000	540.000
JUL	99.000	15.000	20.000	9.000	.	.	16.000	15.000
AUG	59.000	23.000	12.000	12.000	.	.	16.000	16.000
SEP	77.000	24.000	11.000	10.000	.	.	.	.
OCT	30.000	.090 <T	7.900	9.500	.	.	11.000	19.000
NOV	19.000	15.000	15.000	15.000	.	.	15.000	17.000
DEC	23.000	13.000	.	.	9.400	8.600	12.000	12.000
MOLYBDENUM (UG/L)				DET'N LIMIT = 0.020 GUIDELINE = N/A				
APR	.630	.740	.780	.840	.	.	.620	.760
MAY	.770	.830	.760	.740	.	.	.500 <T	.620
JUN	.570	.660	.650	.590	.	.	.300 <T	.350 <T
JUL	.560	.710	.700	.710	.	.	.730	.700
AUG	.730	.780	.840	.860	.	.	.940	.850
SEP	.310 <T	.450 <T	.470 <T	.520	.	.	.	.
OCT	.210 <T	.960	.300 <T	.300 <T	.	.	.480 <T	.230 <T
NOV	.370 <T	.430 <T	.460 <T	.370 <T	.	.	.330 <T	.360 <T
DEC	.350 <T	.420 <T	.	.	.360 <T	.440 <T	.400 <T	.340 <T
NICKEL (UG/L)				DET'N LIMIT = 0.100 GUIDELINE = 50. (F3)				

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE TYPE	WATER TREATMENT PLANT RAW	WATER TREATMENT PLANT TREATED	DISTRIBUTION SYSTEM SITE 1 STANDING	SITE 1 FREE FLOW	SITE 3 STANDING	SITE 3 FREE FLOW	SITE 2 STANDING	SITE 2 FREE FLOW
APR	2.800	1.100 <T	3.400	BDL	.	.	130.000	BDL
MAY	4.700	1.200 <T	4.000	1.600 <T	.	.	350.000	.640 <T
JUN	9.700	10.000	15.000	10.000	.	.	170.000	9.000
JUL	BDL	BDL	5.200	BDL	.	.	42.000	BDL
AUG	.380 <T	.470 <T	2.900	.120 <T	.	.	130.000	.960 <T
SEP	BDL	BDL	.280 <T	BDL	.	.	.	.
OCT	BDL	BDL	1.700 <T	BDL	.	.	850.000 RRV	BDL
NOV	BDL	BDL	1.800 <T	BDL	.	.	110.000	BDL
DEC	BDL	BDL	.	.	14.000	BDL	5.300	BDL
LEAD (UG/L)			DET'N LIMIT = 0.050 GUIDELINE = 50. (A1)					
APR	1.700	.480	4.300	.510	.	.	2.500	.470
MAY	7.000	.450	8.200	.830	.	.	8.200	.540
JUN	.940	.910	6.000	.810	.	.	3.400	.740
JUL	2.400	.880	10.000	.840	.	.	2.500	2.400
AUG	1.400	.680	8.700	.870	.	.	2.000	1.700
SEP	1.200	.270	6.400	.500	.	.	.	.
OCT	.590	BDL	3.500	.330	.	.	5.500	1.300
NOV	1.100	.250	7.200	.320	.	.	3.900	1.600
DEC	1.200	.170 <T	.	.	4.700	.370 <T	3.100	.870
ANTIMONY (UG/L)			DET'N LIMIT = .050 GUIDELINE = 146. (D4)					
APR	.430	.400	.450	.610	.	.	.550	.540
MAY	.840	.790	1.000	1.000	.	.	.750	.570
JUN	.640	.670	.880	.660	.	.	.640	.690
JUL	.410	.490	.780	.650	.	.	.710	.650

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
			SITE 1		SITE 3		SITE 2	
TYPE	RAW	TREATED	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
AUG	.620	.780	.890	.800	.	.	.820	.680
SEP	.380	.610	.700	.430	.	.	.	.
OCT	.340	1.200	.470	.350	.	.	.360	.490
NOV	.460	.440	.480	.390	.	.	.360	.370
DEC	.350 <T	.330 <T	.	.	.460 <T	.380 <T	.390 <T	.380 <T
SELENIUM (UG/L)			DET'N LIMIT = 0.200 GUIDELINE = 10. (A1)					
APR	BDL	2.200 <T	1.500 <T	BDL	.	.	.670 <T	BDL
MAY	BDL	.870 <T	.250 <T	.370 <T	.	.	2.700 <T	2.900 <T
JUN	BDL	BDL	1.900 <T	1.700 <T	.	.	1.500 <T	BDL
JUL	1.300 <T	2.200 <T	4.200 <T	2.000 <T	.	.	2.800 <T	2.300 <T
AUG	1.200 <T	2.300 <T	4.000 <T	3.300 <T	.	.	1.300 <T	4.700 <T
SEP	BDL	BDL	1.200 <T	BDL	.	.	.	.
OCT	BDL	BDL	BDL	BDL	.	.	BDL	BDL
NOV	BDL	BDL	BDL	1.200 <T	.	.	BDL	BDL
DEC	BDL	BDL	.	.	BDL	BDL	BDL	2.100 <T
STRONTIUM (UG/L)			DET'N LIMIT = .050 GUIDELINE = N/A					
APR	220.000	210.000	210.000	210.000	.	.	220.000	200.000
MAY	190.000	180.000	180.000	190.000	.	.	170.000	160.000
JUN	170.000	170.000	170.000	170.000	.	.	180.000	180.000
JUL	220.000	220.000	210.000	220.000	.	.	210.000	220.000
AUG	170.000	170.000	160.000	170.000	.	.	160.000	160.000
SEP	160.000	160.000	160.000	170.000	.	.	.	.
OCT	160.000	45.000	150.000	150.000	.	.	150.000	140.000
NOV	190.000	190.000	200.000	200.000	.	.	190.000	190.000

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE TYPE	WATER TREATMENT PLANT RAW	WATER TREATMENT PLANT TREATED	DISTRIBUTION SYSTEM SITE 1 STANDING	DISTRIBUTION SYSTEM SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 3 STANDING	DISTRIBUTION SYSTEM SITE 3 FREE FLOW	DISTRIBUTION SYSTEM SITE 2 STANDING	DISTRIBUTION SYSTEM SITE 2 FREE FLOW
DEC	180.000	180.000	.	.	180.000	180.000	180.000	180.000
TITANIUM (UG/L)			DET'N LIMIT = .050 GUIDELINE = N/A					
APR	13.000	10.000	11.000	9.500	.	.	9.700	9.600
MAY	13.000	7.300	8.000	7.100	.	.	5.700	6.800
JUN	17.000	15.000	15.000	14.000	.	.	12.000	11.000
JUL	11.000	5.800	7.100	6.500	.	.	6.400	5.700
AUG	11.000	8.400	8.400	7.800	.	.	6.800	7.400
SEP	16.000	7.300	6.700	8.800	.	.	.	.
OCT	7.800	3.000	7.200	7.000	.	.	6.100	6.200
NOV	8.600	7.400	12.000	11.000	.	.	8.500	8.400
DEC	9.000	8.700	.	.	8.900	8.900	7.500	7.600
THALLIUM (UG/L)			DET'N LIMIT = .010 GUIDELINE = 13. (D4)					
APR	.040 <T	.030 <T	BDL	.020 <T	.	.	.060 <T	.050 <T
MAY	.110 <T	.020 <T	.020 <T	BDL	.	.	.070 <T	BDL
JUN	.060 <T	BDL	.030 <T	BDL	.	.	BDL	.030 <T
JUL	BDL	.020 <T	BDL	BDL	.	.	.020 <T	BDL
AUG	.040 <T	BDL	.020 <T	BDL	.	.	BDL	.030 <T
SEP	BDL	BDL	BDL	BDL	.	.	.	.
OCT	.020 <T	.030 <T	BDL	BDL	.	.	.020 <T	BDL
NOV	.070 <T	.070 <T	.030 <T	BDL	.	.	BDL	.020 <T
DEC	BDL	BDL	.	.	BDL	BDL	BDL	BDL
URANIUM (UG/L)			DET'N LIMIT = .020 GUIDELINE = 100.(B1)					
APR	1.400	.950	1.200	1.200	.	.	.830	.780

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
			SITE 1		SITE 3		SITE 2	
TYPE	RAW	TREATED	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
MAY	.660	.560	.580	.580	-	-	.590	.370
JUN	.600	.510	.510	.520	-	-	.400	.420
JUL	.590	.590	.520	.420	-	-	.460	.560
AUG	.580	.360	.390	.420	-	-	.420	.370
SEP	.370	.130 <T	.170 <T	.200 <T	-	-	-	-
OCT	.340	.140 <T	.280	.300	-	-	.220	.210
NOV	.640	.380	.400	.500	-	-	.370	.420
DEC	.430 <T	.330 <T	-	-	.340 <T	.300 <T	.290 <T	.270 <T
VANADIUM (UG/L)			DET'N LIMIT = .050 GUIDELINE = N/A					
APR	.840	2.800	2.400	2.200	-	-	.990	1.100
MAY	2.500	2.500	2.500	2.200	-	-	1.500	1.300
JUN	1.600	3.500	3.200	3.300	-	-	1.900	1.700
JUL	1.600	2.300	2.200	2.000	-	-	.380 <T	1.300
AUG	1.300	2.300	2.000	2.000	-	-	.710	1.300
SEP	1.500	1.800	1.600	1.600	-	-	-	-
OCT	.700	1.500	1.800	1.700	-	-	.870	1.400
NOV	.780	2.100	2.000	1.900	-	-	.970	1.500
DEC	.770	2.000	-	-	1.900	2.000	.840	1.300
ZINC (UG/L)			DET'N LIMIT = .001 GUIDELINE = 5000. (A3)					
APR	13.000	21.000	94.000	4.400	-	-	25.000	3.500
MAY	19.000	21.000	170.000	5.400	-	-	40.000	6.400
JUN	2.600	25.000	120.000	4.900	-	-	33.000	5.100
JUL	15.000	46.000	160.000	4.000	-	-	63.000	9.700
AUG	15.000	31.000	200.000	6.800	-	-	38.000	8.200

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE TYPE	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
	RAW	TREATED	SITE 1		SITE 3		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
SEP	6.800	38.000	140.000	4.300	.	.	.	.
OCT	4.300	2.200	81.000	3.500	.	.	230.000	13.000
NOV	4.200	15.000	250.000	4.400	.	.	160.000	15.000
DEC	7.500	22.000	.	.	86.000	4.500	210.000	10.000

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE TYPE	WATER TREATMENT PLANT RAW	WATER TREATMENT PLANT TREATED	DISTRIBUTION SYSTEM SITE 1 STANDING	DISTRIBUTION SYSTEM SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 3 STANDING	DISTRIBUTION SYSTEM SITE 3 FREE FLOW	DISTRIBUTION SYSTEM SITE 2 STANDING	DISTRIBUTION SYSTEM SITE 2 FREE FLOW
PESTICIDES & PCB								
ALPHA BHC (NG/L)				DET'N LIMIT = 1.000 GUIDELINE = 700 (G)				
APR	BDL	BDL	.	BDL	.	.	.	BDL
MAY	BDL	BDL	.	BDL	.	.	.	BDL
JUN	BDL	BDL	.	BDL	.	.	.	BDL
JUL	BDL	BDL	.	BDL	.	.	.	BDL
AUG	BDL	BDL	.	BDL	.	.	.	BDL
SEP	BDL	BDL	.	BDL	.	.	.	BDL
OCT	BDL	BDL	.	BDL	.	.	.	.
NOV	BDL	1.000 <T	.	BDL	.	.	.	BDL
DEC	BDL	BDL	.	.	.	.	.	BDL
						BDL	.	BDL
ATRAZINE (NG/L)				DET'N LIMIT = 50.00 GUIDELINE = 60000 (83)				
APR	BDL	BDL	.	BDL	.	.	.	BDL
MAY	BDL	BDL	.	BDL	.	.	.	BDL
JUN	400.000 <T	540.000	.	620.000	.	.	.	630.000
JUL	190.000 <T	190.000 <T	.	180.000 <T	.	.	.	190.000 <T
AUG	BDL	BDL	.	.	.	.	.	.
SEP	BDL	BDL	.	.	.	.	.	.
OCT	BDL	BDL	.	.	.	.	.	.
NOV	BDL	BDL	.	.	.	.	.	.
DEC	BDL	BDL	.	.	.	.	.	.
CYANAZINE (BLADEX) (NG/L)				DET'N LIMIT = 100.00GUIDELINE = 10000 (83)				
APR	BDL	BDL	.	BDL	.	.	.	BDL
MAY	BDL	BDL	.	BDL	.	.	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE TYPE	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
	RAW	TREATED	SITE 1		SITE 3		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
JUN	100.000 <T	100.000 <T	.	100.000 <T	.	.	.	100.000 <T
JUL	BDL	BDL	.	BDL	.	.	.	BDL
AUG	BDL	BDL	.	.	.	.	.	.
SEP	BDL	BDL	.	.	.	.	.	.
OCT	BDL	BDL	.	.	.	.	.	.
NOV	BDL	BDL	.	.	.	.	.	.
DEC	BDL	BDL	.	.	.	.	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
SITE TYPE	RAW	TREATED	SITE 1		SITE 3		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
PHENOLICS (UG/L)	PHENOLICS		DET'N LIMIT = 0.2 GUIDELINE = 2.00 (A3)					
APR	3.200	3.600	.	.	.	.	.	.
MAY	2.400	1.600	.	.	.	.	.	.
JUN	1.800	1.600	.	.	.	.	.	.
JUL	3.200	3.000	.	.	.	.	.	.
AUG	3.200	2.600	.	.	.	.	.	.
SEP	4.600	3.800	.	.	.	.	.	.
OCT	4.000	3.800	.	.	.	.	.	.
NOV	1.400	3.000	.	.	.	.	.	.
DEC	.800 <T	1.000	.	.	.	.	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE TYPE	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
	RAW	TREATED	SITE 1		SITE 3		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
VOLATILES								
BENZENE (UG/L)				DET'N LIMIT = .050 GUIDELINE = 5.0 (81)				
APR	.050 <T	.100 <T	.	.050 <T	.	.	.	.050 <T
MAY	BDL	.950	.	.600	.	.	.	BDL
JUN	.200 <T	1.400	.	.600	.	.	.	IIV
JUL	IU	.500	.	.150 <T	.	.	.	.300 <T
AUG	.050 <T	1.200	.	.450 <T	.	.	.	.800
SEP	BDL	BDL	.	BDL	.	.	.	.
OCT	BDL	.150 <T	.	.050 <T	.	.	.	.050 <T
NOV	BDL	BDL	.	BDL	.	.	.	BDL
DEC	BDL	BDL	.	.	.	BDL	.	BDL
TOLUENE (UG/L)				DET'N LIMIT = .050 GUIDELINE = 24.0 (84)				
APR	BDL	.150 <T	.	.100 <T	.	.	.	.050 <T
MAY	BDL	1.800	.	.900	.	.	.	BDL
JUN	BDL	2.400	.	.550	.	.	.	IIV
JUL	IU	.100 <T	.	BDL	.	.	.	.050 <T
AUG	BDL	.550	.	BDL	.	.	.	.100 <T
SEP	BDL	BDL	.	BDL	.	.	.	.
OCT	BDL	.300 <T	.	.150 <T	.	.	.	.200 <T
NOV	BDL	BDL	.	BDL	.	.	.	BDL
DEC	BDL	BDL	.	.	.	BDL	.	BDL
ETHYLBENZENE (UG/L)				DET'N LIMIT = .050 GUIDELINE = 2.4 (84)				
APR	BDL	.050 <T	.	.050 <T	.	.	.	BDL
MAY	BDL	.450 <T	.	.250 <T	.	.	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
			SITE 1		SITE 3		SITE 2	
TYPE	RAW	TREATED	STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
JUN	BDL	.450 <T	.	.100 <T	.	.	.	IIV
JUL	IU	BDL	.	BDL	.	.	.	BDL
AUG	BDL	.050 <T	.	BDL	.	.	.	BDL
SEP	BDL	BDL	.	BDL	.	.	.	.
OCT	BDL	.100 <T	.	BDL	.	.	.	BDL
NOV	BDL	BDL	.	BDL	.	.	.	BDL
DEC	BDL	BDL	.	.	.	BDL	.	BDL
M-XYLENE (UG/L)				DET'N LIMIT = .100 GUIDELINE = 300 (84)				
APR	BDL	.200 <T	.	.200 <T	.	.	.	BDL
MAY	BDL	.900 <T	.	.400 <T	.	.	.	BDL
JUN	BDL	1.400 RMP	.	.300 <T	.	.	.	IIV
JUL	IU	1.000 RMP	.	.200 <T	.	.	.	BDL
AUG	BDL	BDL	.	BDL	.	.	.	BDL
SEP	BDL	BDL	.	BDL	.	.	.	.
OCT	BDL	.400 <T	.	.100 <T	.	.	.	BDL
NOV	BDL	BDL	.	BDL	.	.	.	BDL
DEC	BDL	BDL	.	.	.	BDL	.	BDL
O-XYLENE (UG/L)				DET'N LIMIT = .050 GUIDELINE = 300 (84)				
APR	.050 <T	.100 <T	.	.100 <T	.	.	.	BDL
MAY	BDL	1.000	.	.400 <T	.	.	.	BDL
JUN	BDL	.900	.	.250 <T	.	.	.	IIV
JUL	IU	1.000	.	.250 <T	.	.	.	.050 <T
AUG	BDL	.150 <T	.	BDL	.	.	.	BDL
SEP	BDL	BDL	.	BDL	.	.	.	.

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
TYPE	RAW	TREATED	SITE 1		SITE 3		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
OCT	BDL	.300 <T	.	.050 <T	.	.	.	BDL
NOV	BDL	BDL	.	BDL	.	.	.	BDL
DEC	BDL	BDL	.	.	.	BDL	.	BDL
STYRENE (UG/L)			DET'N LIMIT = .050 GUIDELINE = 46.5 (D2)					
APR	BDL	.050 <T	.	.050 <T	.	.	.	.050 <T
MAY	BDL	.150 <T	.	.250 <T	.	.	.	BDL
JUN	BDL	.100 <T	.	.100 <T	.	.	.	IIV
JUL	IU	BDL	.	.100 <T	.	.	.	BDL
AUG	BDL	.100 <T	.	BDL	.	.	.	BDL
SEP	BDL	BDL	.	BDL	.	.	.	.
OCT	BDL	BDL	.	BDL	.	.	.	BDL
NOV	BDL	.100 <T	.	.050 <T	.	.	.	.100 <T
DEC	BDL	BDL	.	.	.	BDL	.	BDL
CHLOROFORM (UG/L)			DET'N LIMIT = .100 GUIDELINE = 350 (A1+)					
APR	.300 <T	118.000	.	154.000	.	.	.	104.000
MAY	.100 <T	130.000	.	125.000	.	.	.	125.000
JUN	.200 <T	190.000	.	215.000	.	.	.	IIV
JUL	IU	253.000	.	198.000	.	.	.	170.000
AUG	.300 <T	151.000	.	165.000	.	.	.	153.000
SEP	BDL	119.000	.	148.000	.	.	.	.
OCT	BDL	109.200	.	132.600	.	.	.	90.600
NOV	BDL	70.700	.	67.000	.	.	.	63.300
DEC	.100 <T	109.200	.	.	.	90.200	.	81.700

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE TYPE	WATER TREATMENT PLANT RAW	WATER TREATMENT PLANT TREATED	DISTRIBUTION SYSTEM SITE 1 STANDING	DISTRIBUTION SYSTEM SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 3 STANDING	DISTRIBUTION SYSTEM SITE 3 FREE FLOW	DISTRIBUTION SYSTEM SITE 2 STANDING	DISTRIBUTION SYSTEM SITE 2 FREE FLOW
111, TRICHLOROETHANE (UG/L)				DET'N LIMIT = .020 GUIDELINE = 200 (D1)				
APR	BDL	BDL	.	BDL	.	.	.	BDL
MAY	BDL	BDL	.	BDL	.	.	.	BDL
JUN	BDL	BDL	.	BDL	.	.	.	IIV
JUL	IU	BDL	.	BDL	.	.	.	BDL
AUG	.060 <T	BDL	.	BDL	.	.	.	BDL
SEP	BDL	BDL	.	BDL	.	.	.	.
OCT	BDL	BDL	.	BDL	.	.	.	BDL
NOV	BDL	BDL	.	BDL	.	.	.	BDL
DEC	BDL	BDL	.	.	.	BDL	.	BDL
CARBON TETRACHLORIDE (UG/L)				DET'N LIMIT = .200 GUIDELINE = 5.0 (D1)				
APR	BDL	BDL	.	BDL	.	.	.	BDL
MAY	BDL	BDL	.	BDL	.	.	.	BDL
JUN	BDL	BDL	.	BDL	.	.	.	IIV
JUL	IU	BDL	.	.400 <T	.	.	.	BDL
AUG	BDL	BDL	.	BDL	.	.	.	BDL
SEP	BDL	BDL	.	BDL	.	.	.	.
OCT	BDL	BDL	.	BDL	.	.	.	BDL
NOV	BDL	BDL	.	BDL	.	.	.	BDL
DEC	BDL	BDL	.	.	.	BDL	.	BDL
DICHLOROBROMOMETHANE (UG/L)				DET'N LIMIT = .050 GUIDELINE = 350 (A1+)				
APR	BDL	6.650	.	8.300	.	.	.	5.600
MAY	BDL	10.950	.	10.800	.	.	.	9.050
JUN	BDL	12.600 APS	.	13.750 APS	.	.	.	IIV

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE TYPE	RAW	TREATED	SITE 1		SITE 3		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
			WATER TREATMENT PLANT		DISTRIBUTION SYSTEM			
JUL	IU	18.400	.	18.550	.	.	.	16.650
AUG	BDL	13.950	.	15.550	.	.	.	13.250
SEP	BDL	12.100	.	13.150	.	.	.	.
OCT	BDL	10.600	.	11.700	.	.	.	8.300
NOV	BDL	7.500	.	6.650	.	.	.	6.300
DEC	BDL	12.500	.	.	.	10.850	.	10.400
CHLORODIBROMOETHANE (UG/L)				DET'N LIMIT = .100 GUIDELINE = 350 (A1+)				
APR	BDL	.400 <T	.	.500 <T	.	.	.	.300 <T
MAY	BDL	.500 <T	.	.600 <T	.	.	.	.500 <T
JUN	BDL	.600 <T	.	.600 <T	.	.	.	IIV
JUL	IU	.800 <T	.	.600 <T	.	.	.	.700 <T
AUG	BDL	.700 <T	.	.400 <T	.	.	.	.600 <T
SEP	BDL	.400 <T	.	.700 <T	.	.	.	.
OCT	BDL	.500 <T	.	.400 <T	.	.	.	.900 <T
NOV	BDL	.600 <T	.	.400 <T	.	.	.	.400 <T
DEC	BDL	1.300	.	.	.	.600 <T	.	1.100
T-CHLOROETHYLENE (UG/L)				DET'N LIMIT = .050 GUIDELINE = 10.0 (C2)				
APR	BDL	.100 <T	.	.100 <T	.	.	.	.100 <T
MAY	BDL	.200 <T	.	.200 <T	.	.	.	.150 <T
JUN	BDL	.600 UIN	.	.850 UIN	.	.	.	IIV
JUL	IU	.500	.	.550	.	.	.	.500
AUG	BDL	.250 <T	.	.350 <T	.	.	.	.200 <T
SEP	BDL	BDL	.	BDL	.	.	.	.
OCT	BDL	BDL	.	BDL	.	.	.	BDL

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE TYPE	WATER TREATMENT PLANT RAW	WATER TREATMENT PLANT TREATED	DISTRIBUTION SYSTEM SITE 1 STANDING	DISTRIBUTION SYSTEM SITE 1 FREE FLOW	DISTRIBUTION SYSTEM SITE 3 STANDING	DISTRIBUTION SYSTEM SITE 3 FREE FLOW	DISTRIBUTION SYSTEM SITE 2 STANDING	DISTRIBUTION SYSTEM SITE 2 FREE FLOW
NOV	BDL	BDL	.	BDL	.	.	.	BDL
DEC	BDL	BDL	.	.	.	BDL	.	.050 <T
BROMOFORM (UG/L)			DET'N LIMIT = .200 GUIDELINE = 350 (A1+)					
APR	BDL	BDL	.	BDL	.	.	.	BDL
MAY	BDL	BDL	.	BDL	.	.	.	BDL
JUN	BDL	BDL	.	BDL	.	.	.	IIV
JUL	IU	BDL	.	BDL	.	.	.	BDL
AUG	BDL	BDL	.	BDL	.	.	.	BDL
SEP	BDL	BDL	.	BDL	.	.	.	.
OCT	BDL	BDL	.	BDL	.	.	.	BDL
NOV	BDL	BDL	.	BDL	.	.	.	BDL
DEC	BDL	BDL	.	.	.	BDL	.	BDL
1,2 DICHLOROBENZENE (UG/L)			DET'N LIMIT = .050 GUIDELINE = 200 (B1)					
APR	BDL	BDL	.	BDL	.	.	.	BDL
MAY	BDL	BDL	.	BDL	.	.	.	BDL
JUN	BDL	BDL	.	BDL	.	.	.	IIV
JUL	IU	BDL	.	BDL	.	.	.	BDL
AUG	BDL	BDL	.	BDL	.	.	.	BDL
SEP	BDL	BDL	.	BDL	.	.	.	.
OCT	BDL	BDL	.	BDL	.	.	.	BDL
NOV	BDL	BDL	.	BDL	.	.	.	BDL
DEC	BDL	BDL	.	.	.	BDL	.	BDL
TOTL TRIHALOMETHANES (UG/L)			DET'N LIMIT = .500 GUIDELINE = 350 (A1)					

TABLE 5

DRINKING WATER SURVEILLANCE PROGRAM LINDSAY WTP 1989

SITE TYPE	WATER TREATMENT PLANT		DISTRIBUTION SYSTEM					
	RAW	TREATED	SITE 1		SITE 3		SITE 2	
			STANDING	FREE FLOW	STANDING	FREE FLOW	STANDING	FREE FLOW
APR	BDL	125.050	.	162.800	.	.	.	109.900
MAY	BDL	141.450	.	136.400	.	.	.	134.550
JUN	BDL	203.200	.	229.350	.	.	.	IIV
JUL	IU	272.200	.	217.150	.	.	.	187.350
AUG	BDL	165.650	.	180.950	.	.	.	166.850
SEP	BDL	131.500	.	161.850	.	.	.	.
OCT	BDL	120.300	.	144.700	.	.	.	99.800
NOV	BDL	78.800	.	74.050	.	.	.	70.000
DEC	BDL	122.950	.	.	.	101.650	.	93.200

TRACE LEVELS OF TOLUENE ARE LABORATORY ARTIFACTS DERIVED FROM THE ANALYTICAL METHODOLOGY.

TRACE LEVELS OF STYRENE ARE CONSIDERED TO BE LABORATORY ARTIFACTS RESULTING FROM THE LABORATORY SHIPPING CONTAINERS.

Table 6

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
BACTERIOLOGICAL			
STANDARD PLATE COUNT MEMBRANE FILTRATION	CT/ML	0	500/ML(A1)
P/A BOTTLE		0	0 (A1*)
TOTAL COLIFORM MEMBRANE FILTRATION	CT/100ML	0	5/100mL(A1)
TOTAL COLIFORM BACKGROUND MF	CT/100ML	0	N/A
CHLOROAROMATICS			
HEXACHLOROBUTADIENE	NG/L	1.000	450. (D4)
1,2,3-TRICHLOROBENZENE	NG/L	5.000	10000 (I)
1,2,3,4-TETRACHLOROBENZENE	NG/L	1.000	10000 (I)
1,2,3,5-TETRACHLOROBENZENE	NG/L	1.000	10000 (I)
1,2,4-TRICHLOROBENZENE	NG/L	5.000	10000 (I)
1,2,4,5-TETRACHLOROBENZENE	NG/L	1.000	38000 (D4)
1,3,5-TRICHLOROBENZENE	NG/L	5.000	10000 (D4)
HEXACHLOROBENZENE	NG/L	1.0	10. (C1)
HEXACHLOROETHANE	NG/L	1.000	1900. (D4)
OCTACHLOROSTYRENE	NG/L	1.000	N/A
PENTACHLOROBENZENE	NG/L	1.000	74000 (D4)
2,3,6-TRICHLOROTOLUENE	NG/L	5.000	N/A
2,4,5-TRICHLOROTOLUENE	NG/L	5.000	N/A
2,6,A-TRICHLOROTOLUENE	NG/L	5.000	N/A
CHLOROPHENOLS			
2,3,4-TRICHLOROPHENOL	NG/L	50.	N/A
2,3,4,5-TETRACHLOROPHENOL	NG/L	50.	N/A
2,3,5,6-TETRACHLOROPHENOL	NG/L	50.	N/A
2,4,5-TRICHLOROPHENOL	NG/L	50.	2600000 (D4)
2,4,6-TRICHLOROPHENOL	NG/L	50.	2000. (B4)
PENTACHLOROPHENOL	NG/L	50.	30000. (B4)
CHEMISTRY (FLD)			
FIELD COMBINED CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD FREE CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD TOTAL CHLORINE RESIDUAL	MG/L	N/A	N/A
FIELD PH	DMSNLESS	N/A	6.5-8.5(A4)
FIELD TEMPERATURE	°C	N/A	<15 °C(A1)
FIELD TURBIDITY	FTU	N/A	1.0 (A1)
CHEMISTRY (LAB)			
ALKALINITY	MG/L	.200	30-500(A4)
CALCIUM	MG/L	.100	100. (F2)
CYANIDE	MG/L	.001	.20(A1)
CHLORIDE	MG/L	.200	250. (A3)
COLOUR	TCU	.5	5.0 (A3)
CONDUCTIVITY	UMHO/CM	1.	400. (F2)
FLUORIDE	MG/L	.01	2.4 (A1)
HARDNESS	MG/L	.50	80-100(A4)
MAGNESIUM	MG/L	.05	30. (F2)

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE
NITRITE	MG/L	.001	1.0 (A1)
TOTAL NITRATES	MG/L	.02	10. (A1)
NITROGEN TOTAL KJELDAHL	MG/L	.02	N/A
PH	DMSNLESS	N/A	6.5-8.5(A4)
PHOSPHORUS FIL REACT	MG/L	.0005	N/A
PHOSPHORUS TOTAL	MG/L	.002	.40(F2)
TOTAL SOLIDS	MG/L	1.	500. (A3)
TURBIDITY	FTU	.02	1.0 (A1)
METALS			
ALUMINUM	UG/L	.050	100. (A4)
ANTIMONY	UG/L	.050	10. (F3)
ARSENIC	UG/L	.050	50. (A1)
BARIUM	UG/L	.020	1000. (A1)
BORON	UG/L	.200	5000. (A1)
BERYLLIUM	UG/L	.010	0.20 (H)
CADMIUM	UG/L	.050	5.0 (A1)
COBALT	UG/L	.020	1000. (H)
CHROMIUM	UG/L	.100	50. (A1)
COPPER	UG/L	.100	1000. (A3)
IRON	UG/L	5.0	300. (A3)
MERCURY	UG/L	.01	1.0 (A1)
MANGANESE	UG/L	.050	50. (A3)
MOLYBDENUM	UG/L	.020	500. (H)
NICKEL	UG/L	.100	50. (F3)
LEAD	UG/L	.020	50. (A1)
SELENIUM	UG/L	.200	10. (A1)
SILVER	UG/L	.020	50. (A1)
STRONTIUM	UG/L	.100	2000. (H)
THALLIUM	UG/L	.010	13. (D4)
TITANIUM	UG/L	.100	N/A
URANIUM	UG/L	.020	20. (A2)
VANADIUM	UG/L	.020	100. (H)
ZINC	UG/L	.020	5000. (A3)
PHENOLICS			
PHENOLICS (UNFILTERED REACTIVE)	UG/L	.2	2.0 (A3)
PESTICIDES & PCB			
ALDRIN	NG/L	1.0	700. (A1)
AMETRINE	NG/L	50.	300000. (D3)
ATRAZINE	NG/L	50.	60000. (B3)
ALPHA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	700. (G)
BETA HEXACHLOROCYCLOHEXANE (BHC)	NG/L	1.0	300. (G)
GAMMA HEXACHLOROCYCLOHEXANE(LINDANE)	NG/L	1.0	4000. (A1)
ALPHA CHLORDANE	NG/L	2.0	7000. (A1)
GAMMA CHLORDANE	NG/L	2.0	7000. (A1)
BLADEX	NG/L	100.	10000. (B3)
DIELDRIN	NG/L	2.0	700. (A1)
METHOXYCHLOR	NG/L	5.0	900000. (B1)
ENDOSULFAN 1 (THIODAN I)	NG/L	2.0	74000. (D4)
ENDOSULFAN 2 (THIODAN II)	NG/L	4.0	74000. (D4)
ENDRIN	NG/L	4.0	200. (A1)
ENDOSULFAN SULPHATE(THIODAN SULPHATE)	NG/L	4.0	N/A
HEPTACHLOR EPOXIDE	NG/L	1.0	3000. (A1)

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE	
HEPTACHLOR	NG/L	1.0	3000.	(A1)
METOLACHLOR	NG/L	500.	50000.	(B3)
MIREX	NG/L	5.0	N/A	
OXYCHLORDANE	NG/L	2.0	N/A	
O,P-DDT	NG/L	5.0	30000.	(A1)
PCB	NG/L	20.0	3000.	(A2)
O,P-DDD	NG/L	5.0	N/A	
PPDDE	NG/L	1.0	30000.	(A1)
PPDDT	NG/L	5.0	30000.	(A1)
ATRATONE	NG/L	50.	N/A	
ALACHLOR	NG/L	500.	35000.	(D2)
PROMETONE	NG/L	50.	52500.	(D3)
PROPAZINE	NG/L	50.	16000.	(D2)
PROMETRYNE	NG/L	50.	1000.	(B3)
SENCOR (METRIBUZIN)	NG/L	100.	80000.	(B2)
SIMAZINE	NG/L	50.	10000.	(B3)
POLYAROMATIC HYDROCARBONS				
PHENANTHRENE	NG/L	10.0	N/A	
ANTHRACENE	NG/L	1.0	N/A	
FLUORANTHENE	NG/L	20.0	42000.	(D4)
PYRENE	NG/L	20.0	N/A	
BENZO(A)ANTHRACENE	NG/L	20.0	N/A	
CHRYSENE	NG/L	50.0	N/A	
DIMETHYL BENZO(A)ANTHRACENE	NG/L	5.0	N/A	
BENZO(E)PYRENE	NG/L	50.0	N/A	
BENZO(B)FLUORANTHENE	NG/L	10.0	N/A	
PERYLENE	NG/L	10.0	N/A	
BENZO(K)FLUORANTHENE	NG/L	1.0	N/A	
BENZO(A)PYRENE	NG/L	5.0	10.	(B1)
BENZO(G,H,I)PERYLENE	NG/L	20.0	N/A	
DIBENZO(A,H)ANTHRACENE	NG/L	10.0	N/A	
INDENO(1,2,3-C,D)PYRENE	NG/L	20.0	N/A	
BENZO(B)CHRYSENE	NG/L	2.0	N/A	
CORONENE	NG/L	10.0	N/A	
SPECIFIC PESTICIDES				
TOXAPHENE	NG/L	N/A	5000.	(A1)
2,4,5-TRICHLOROBUTYRIC ACID (2,4,5-T)	NG/L	50.	200000.	(B4)
2,4-DICHLOROBUTYRIC ACID (2,4-D)	NG/L	100.	100000.	(A1)
2,4-DICHLORORPHENOXYBUTYRIC ACID	NG/L	200.	18000.	(B3)
2,4-D PROPIONIC ACID	NG/L	100.	N/A	
DICAMBA	NG/L	100.	120000.	(B1)
PICLORAM	NG/L	100.	190000.	(B3)
SILVEX (2,4,5-TP)	NG/L	50.	10000.	(A1)
DIAZINON	NG/L	20.	20000.	(B1)
DICHLOROVOS	NG/L	20.	N/A	
DURSBAN	NG/L	20.	N/A	
ETHION	NG/L	20.	35000.	(G)
GUTHION(AZINPHOSMETHYL)	NG/L	N/A	20000.	(B1)
MALATHION	NG/L	20.	190000.	(B1)
MEVINPHOS	NG/L	20.	N/A	
METHYL PARATHION	NG/L	50.	7000.	(A1)
METHYLTRITHION	NG/L	20.	N/A	
PARATHION	NG/L	20.	50000.	(B1)

SCAN/PARAMETER	UNIT	DETECTION LIMIT	GUIDELINE	
PHORATE (THIMET)	NG/L	20.	2000.	(B3)
RELDAN	NG/L	20.	N/A	
RONNEL	NG/L	20.	N/A	
AMINOCARB	NG/L	N/A	N/A	
BENONYL	NG/L	N/A	N/A	
BUX (METALKAMATE)	NG/L	2000.	N/A	
CARBOFURAN	NG/L	2000.	90000.	(B1)
CICP (CHLORPROPHAM)	NG/L	2000.	350000.	(G)
DIALLATE	NG/L	2000.	30000.	(H)
EPTAM	NG/L	2000.	N/A	
IPC	NG/L	2000.	N/A	
PROPOXUR (BAYGON)	NG/L	2000.	90000.	(G)
SEVIN (CARBARYL)	NG/L	200.	90000.	(B1)
SUTAN (BUTYLATE)	NG/L	2000.	245000.	(D3)
VOLATILES				
BENZENE	UG/L	.050	5.0	(B1)
TOLUENE	UG/L	.050	24.0	(B4)
ETHYLBENZENE	UG/L	.050	2.4	(B4)
PARA-XYLENE	UG/L	.100	300.	(B4)
META-XYLENE	UG/L	.100	300.	(B4)
ORTHO-XYLENE	UG/L	.050	300.	(B4)
1,1-DICHLOROETHYLENE	UG/L	.100	7.0	(D1)
ETHLYENE DIBROMIDE	UG/L	.05	.05	G)
METHYLENE CHLORIDE	UG/L	.500	50.	(B1)
TRANS-1,2-DICHLOROETHYLENE	UG/L	.100	70.	(D5)
1,1-DICHLOROETHANE	UG/L	.100	N/A	
CHLOROFORM	UG/L	.100	350.	(A1+)
1,1,1-TRICHLOROETHANE	UG/L	.020	200.	(D1)
1,2-DICHLOROETHANE	UG/L	.050	5.0	(D1)
CARBON TETRACHLORIDE	UG/L	.200	5.0	(B1)
1,2-DICHLOROPROPANE	UG/L	.050	6.0	(D5)
TRICHLOROETHYLENE	UG/L	.100	50.	(B1)
DICHLOROBROMOMETHANE	UG/L	.050	350.	(A1+)
1,1,2-TRICHLOROETHANE	UG/L	.050	.60	(D4)
CHLORODIBROMOMETHANE	UG/L	.100	350.	(A1+)
TETRACHLOROETHYLENE	UG/L	.050	10.0	(C2)
BROMOFORM	UG/L	.200	350.	(A1+)
1,1,2,2-TETRACHLOROETHANE	UG/L	.050	0.17	(D4)
CHLOROBENZENE	UG/L	.100	60.	(D5)
1,4-DICHLOROBENZENE	UG/L	.100	1.0	(B4)
1,3-DICHLOROBENZENE	UG/L	.100	130.	(G)
1,2-DICHLOROBENZENE	UG/L	.050	3.0	(B4)
TRIFLUOROCHLOROTOLUENE	UG/L	.100	N/A	
TOTAL TRIHALOMETHANES	UG/L	.500	350.	(A1)
STYRENE	UG/L	.05	140.	(D5)

Appendix A

DRINKING WATER SURVEILLANCE PROGRAM

The Drinking Water Surveillance Program (DWSP) for Ontario monitors drinking water quality at municipal water supply systems. The DWSP Database Management System provides a computerized drinking water quality information system for the supplies monitored. The objectives of the program are to provide:

- immediate, reliable, current information on drinking water quality,
- a flagging mechanism for 'Objective' exceedence,
- a definition of contaminant levels and trends,
- a comprehensive background for remedial action,
- a framework for assessment of new contaminants,
- and an indication of treatment efficiency of plant processes.

Program

The DWSP officially began in April 1986 and is designed to eventually include all municipal water supplies in Ontario; currently 44 plants are being monitored. Water supply locations have been prioritized for surveillance, based primarily on criteria such as population density, probability of contamination and geographical location.

An ongoing assessment of future monitoring requirements at each location will be made. Monitoring will continue at the initial locations at an appropriate level and further locations will be phased into the program as resources permit. It is estimated that after 4 years of operation, the program will be monitoring 90 locations.

A major goal of the program is to collect valid water quality data, in context with plant operational characteristics at the time of sampling. As soon as sufficient data have been accumulated and analysed, both the frequency of sampling and the range of parameters may be adjusted accordingly.

Assessments are carried out at all locations prior to initial sampling in order to acquire complete plant process and distribution system details, and to designate (and retrofit if necessary) all sampling systems and locations. This ensures that the sampled water is a reflection of the water itself.

Samples are taken of the raw (ambient water) and the treated water at the treatment plant, and of consumer's tap water in the distribution system. In order to determine possible effects of distribution on water quality, both standing and free flow water in old and new sections of the distribution system are sampled.

Sampling is carried out by operational personnel who have been trained in the applicable procedures.

Comprehensive standardized procedures and Field Test kits are supplied to sampling personnel. This ensures that samples are taken and handled according to standard protocols and that field testing will supply reliable data. All field and laboratory analyses are carried out using "approved documented procedures". All laboratory analyses are carried out by the MOE Laboratory Services Branch.

Data Reporting Mechanism

When the analytical results are transferred from the MOE laboratory into the DWSP system, printouts of the completed analyses are sent to the MOE District Officer, the appropriate operational staff and are also retained by the DWSP co-ordinator.

DWSP INPUTS AND OUTPUTS

The DWSP INPUTS and OUTPUTS are illustrated in Fig. 1.

PROGRAM INPUTS

PLANT AND DISTRIBUTION SYSTEM DESCRIPTION

The system description includes plant specific non-analytical information acquired through a questionnaire and initial plant

visit. During the initial assessment of the plant and distribution system the questionnaire content is verified and missing information added. It is intended that all data be kept current with scheduled annual updates.

The PLANT and DISTRIBUTION SYSTEM DESCRIPTION consists of the following seven components.

1. Process component inventory

All physical and chemical processes that the water is subjected to, from the intake pipe to the consumers' tap (where possible), are documented. These include: process type, general description of physical structures, material types, sizes, and retention time for each process within the plant. The processes may be as simple as transmission or as complex as carbon adsorption.

2. Treatment chemicals

Chemicals used in the treatment processes, their function, application point, supplier and brand-name are recorded. The chemical dosages applied on the day of sampling are recorded in DWSP.

3. Process control measurements

Documentation of in-plant monitoring of process parameters (turbidity, chlorine residuals, pH, aluminum residuals) including methods used, monitoring locations and frequency is contained in

this section. In-plant monitoring results are generally not retained in DWSP but are retained by the Water Treatment Plant.

4. Design flow and retention time

The hydraulic capacity, designed and actual, is noted here. Retention time (the time that a block of water is retained in the plant) is also noted. The maximum, minimum and average flow as well as a record of the flow rate on the day of sampling are recorded in DWSP.

5. Distribution system description

This area includes the storage and transmission characteristics of the distribution system after the water leaves the plant.

6. Sampling system

Each plant is assessed for its adequacy in terms of sampling of bacteriological, organic and inorganic parameters. The prime considerations in the assessment and design of the sampling system are:

i/ the sample is an accurate representation of the actual water condition, eg. raw water has had no chemical treatment;

ii/ the water being sampled is not being modified by the sampling system;

iii/ the sample tap must be in a clean area of the plant,

preferably a lab area;

iv/ the sample lines must be organically inert (no plastic, ideally stainless steel).

It is imperative that the sampled water be a reflection not of the sampling system but of the water itself.

The sampling system documentation includes: origin of the water; date sampling was initiated; size, length and material type (intake, discharge and tap), pump characteristics (model, type, capacity) and flow rate.

7. People

This section contains the names, addresses and phone numbers of current plant management and operational staff, distribution system management and operational staff, Medical Officer of Health and appropriate Ministry of Environment personnel associated with the plant.

FIELD DATA

The second major input to DWSP is field data.

Field data is collected at the plant and from the distribution system sites on the day of sampling. The field data consists of general operating conditions and the results of testing for field parameters. General operating conditions include chemicals used,

dosages, flow and retention time on the day of sampling as well as monthly maximum, minimum and average flows. Field parameters include turbidity, chlorine residuals (free,combined and total), temperature and pH. These parameters are analysed according to standardized DWSP protocols to allow for interplant comparison.

LABORATORY ANALYTICAL DATA

The third major input to DWSP is Laboratory Analytical Data.

Samples gathered from the raw, treated and distribution sampling sites are analyzed for approximately 180 parameters at a frequency of two to twelve times per year. Sixty-five percent of the parameters are organic. The parameters measured may have health or aesthetic implications when present in drinking water. Many of the parameters may be used in the treatment process or may be treatment by-products. Due to the nature of certain analytical instruments parameters may be measured for in a "scan" producing some results for parameters that are not on the DWSP priority list but which may be of interest. The majority of the parameters are measured on a routine basis however, those that are technically more difficult and/or costly to analyse for are done less frequently. These include Specific Pesticides and Chlorophenols.

Although the parameter list is extensive, additional parameters with the potential to cause health or aesthetic related problems

may be added provided reliable analytical and sampling methods exist.

All laboratory generated data is derived from standardized, documented analytical protocols. The analytical method is an integral part of the data and as methods change notation will e be made and intercomparison data documented.

PARAMETER REFERENCE INFORMATION

The fourth major input to DWSP is Parameter Reference Information. This is a catalogue of information for each substance analysed on DWSP. It includes parameter name and aliases, physical and chemical properties, basic toxicology, world-wide health limits, treatment methods and uses. The Parameter Reference Information is computerized and can be accessed through the Query function of the DWSP database.

An example is shown in fig. 2.

A written copy (hard version) of the Parameter Reference Information will be available in the near future and is a new and sophisticated enhancement to the DWSP.

PROGRAM OUTPUTS

There are four major program outputs, Query, Action Alert, Report Generation and the Annual Report.

QUERY

All DWSP information is easily accessed through the Query function, therefore anything from addresses of plant personnel to complete water quality information for a plant's water supply is instantly available. The DWSP computer system makes relatively complex inquiries manageable. A personal password allowing access into the DWSP query mode in all MOE offices is being developed by the DWSP group.

ACTION ALERTS

Drinking Water quality in Ontario is evaluated against provincial objectives as outlined in the publication, Ontario Drinking Water Objectives (ISBN 0-7729-2725-1 revised 1983). This publication contains health-related Maximum Acceptable Concentrations for thirty substances. Should the reported level of a substance in treated water exceed the Ontario Drinking Water Objective an "Action Alert" requiring resampling and confirmation is issued. This assures that operational staff, health authorities and the public are notified as soon as possible of confirmation of an exceedance and remedial action taken. This report supplies a history of the occurrence of past exceedences at the plant plus a historical summary on the parameter of concern.

In the absence of Ontario Drinking Water Objectives, other agency guidelines which are documented in the Parameter Reference

Information may be used. If these guidelines are exceeded the results are flagged and evaluated by DWSP personnel. An "Action Alert" will be issued if warranted.

REPORT GENERATION

Custom reports can be generated from DWSP to meet the needs of the regions and to respond to public requests.

ANNUAL REPORTS

It is the practice of DWSP to produce an annual report containing analytical data along with companion plant information.

FIG. 1

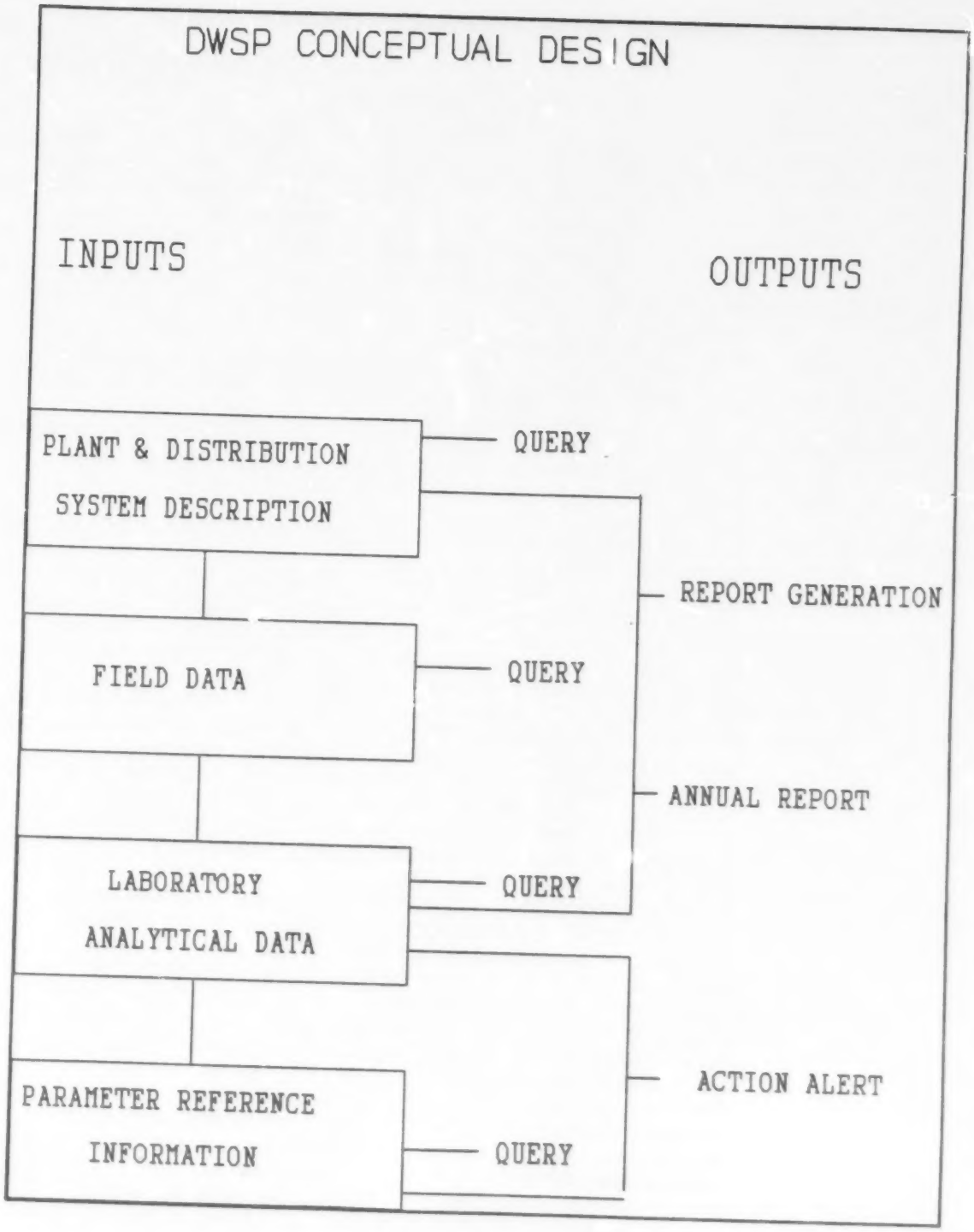
DWSP CONCEPTUAL DESIGN
INPUTS
OUTPUTS
PLANT & DISTRIBUTION SYSTEM DESCRIPTION
QUERY
REPORT GENERATION
FIELD DATA
QUERY
ANNUAL REPORT
LABORATORY ANALYTICAL DATA
QUERY
ACTION ALERT
PARAMETER REFERENCE INFORMATION
QUERY

FIG.2

MOE - DRINKING WATER ASSESSMENT PROGRAM (DWSP)

(B2001P) PARAMETER REFERENCE
BENZENE

SOURCE	FROM	TO	METHOD	TARG	UNIT	NOTE
EPA	C 86/04		NOMETH	.00	063000 UG/L	RMCL
EPAA	C 80/11		NOMETH	6.60	063000 UG/L	
FERC	C 84/05		NOMETH	1.00	063000 UG/L	
WHO	C 84/01		NOMETH	10.00	064000 UG/L	

DESCRIPTION: NAME: BENZENE
CAS#: 71432
MOLECULAR FORMULAE: C_6H_6
DETECTION LIMIT: (FOR METHOD POCODO) 0.05 UG/L
SYNONYMS: BENZOLE, COAL NAPHTHA, CARBON OIL (27), CYCLOHEXATRIENE (41)
CHARACTERISTICS: COLOURLESS TO LIGHT YELLOW, MOBILE, NON-POLAR LIQUID, OF HIGHLY REFRACTIVE NATURE, AROMATIC, VAPOURS BURN WITH SMOKING FLAME (30)
PROPERTIES:
SOLUBILITY IN WATER: 1780-1800 MG/L AT 25 DEG C (41)
THRESHOLD ODOUR: NO DATA
THRESHOLD TASTE: 0.5 MG/L IN WATER (39)
ENVIRONMENTAL FATE: MAY BIOACCUMUALTE IN LIVING ORGANISMS, APPEARS TO BIOACCUMULATE IN ANIMAL TISSUES THAT EXHIBIT HIGH LIPID CONTENT OR ARE MAJOR METABOLIC SITES (LIVER, BRAIN), SMALL QUANITIES EVAPORATE FROM SOIL OR DEGRADE QUICKLY
SOURCES: PETROLEUM REFINING, SOLVENT RECOVERY, COAL TAR DISTILLATION, FOOD PROCESSING, TANNING.
USES: PREPERATION OF ETHYL BENZENE USED AS A STYRENE MONOMER, DETERGENTS, NYLON, AS INTERMEDIATE IN PESTICIDE PRODUCTION, SOLVENT IN RUBBER INDUSTRY, DEGREASING AND CLEANSING AGENT, GASOLINE.
TOXICITY: RATING 4 (VERY TOXIC); ACUTE - IRRITATES MUCOUS MEMBRANES, SYMPTONS INCLUDE RESTLESSNESS, CONVULSIONS, DEPRESSION, RESPIRATORY FAILURE; CHRONIC - ANEMIA AND LEUKEMIA (45).
CARINOGENICITY: HUMAN CARCINOGEN AND MUTAGEN
REMOVAL: GAC ADSORPTION, PRECIPITATION WITH ALUM FOLLOWED BY SEDIMENTATION, COAGULATION AND FLOCCULATION, SOLVENT EXTRACTION, OXIDATION (41).
MOLECULAR WEIGHT: 78.12 GRAMS
MELTING POINT: 5.5 DEGREES C (27)
BOILING POINT: 80.1 DEGREES C (27)
SPECIFIC GRAVITY: 0.879 AT 20 DEGREES C (27)
VAPOUR PRESSURE: 100 MM AT 26.1 DEGREES C
HENRY'S LAW CONSTANT: 0.00555 ATM M_3/MOLE
LOG OCT./WATER PAR.COEFF: K=1.0 1/N=1.6 R=.97 PH=5.3

Appendix B

DWSP SAMPLING GUIDELINE

i) RAW and TREATED at PLANT

General Chemistry	-500 mL clear plastic bottle -rinse bottle with sample three times and discard water -fill to line
Bacti	-250 mL clear glass bottle with white seal on cap -do <u>not</u> rinse bottle; preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid (**Caution:** HNO_3 is corrosive)
Volatiles (OPOPUP)	-250 mL clear glass bottle -do <u>not</u> rinse bottle -tilt bottle when filling -fill bottle completely; there should be no air bubbles.
Organic (OWOC),(OWTRI),(OAPAHX)	-1 liter brown glass bottle per scan -do <u>not</u> rinse bottle -fill to approx. 1" from top -when 'special pesticides' are requested three extra bottles per sample must be submitted
Cyanide	-500 mL clear plastic bottle -do <u>not</u> rinse bottle -fill to approx. 1" from top -add 10 drops sodium hydroxide (**Caution:** NaOH is corrosive)

Mercury	-250 mL clear glass bottle -rinse bottle and cap three times, discard then fill to top of label -add 20 drops each nitric acid and potassium dichromate (**Caution:** HNO_3 and $KCrO_7$ corrosive)
Phenols	-250 mL clear glass bottle -do <u>not</u> rinse bottle -fill to top of label as marked

<u>Steps</u>

1. Let cold water tap run for several minutes.
2. Record time in submission sheet.
3. Record teperature on submission sheet.
4. Fill up all bottles as per instructions.
5. Record chlorine residuals (free, combined and total for treated water only), turbidity and pH on submission sheet.

ii) Distribution Samples (standing water)

General Chemistry	-500 mL clear palstic bottle -rinse bottle with sample three times and discard -fill to line
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid (Caution: HNO_3 is corrosive)

Steps:

1. Record time on submission sheet.
2. Place bucket under tap and open cold water.
3. Fill to predetermined volume.
4. After mixing the water, record the temperature on the submission sheet.
5. Fill general chemistry and metals bottles.
6. Record chlorine residuals (free, combined and total), turbidity and pH on submission sheet.

iii) Distribution Samples (free flow)

General Chemistry	-500 mL clear plastic bottle -rinse bottle with sample three times and discard water -fill to line
Bacti	-250 mL clear glass bottle with white seal on cap -do <u>not</u> rinse bottle; preservative has been added -avoid touching bottle neck or inside of cap -fill to top of red label as marked
Metals	-500 mL clear plastic bottle with white lid -rinse bottle and cap three times, discard -fill to line -add 10 drops nitric acid (**Caution:** HNO_3 is corrosive)
Volatiles (OPOPUP)	-250 mL clear glass bottle -do <u>not</u> rinse bottle; preservative has been added -tilt bottle when filling -fill bottle completely; there should be no air bubbles
Organic (OWOC),(OWTRI)	-1 liter brown glass bottle per scan -do <u>not</u> rinse bottle: preservative has been added -fill to approx. 1" from top
Cyanide	-500 mL clear plastic bottle -do <u>not</u> rinse bottle: preservative has been added -fill to approx. 1" from top -add 10 drops sodium hydroxide (**Caution:** NaOH is corrosive)
Mercury	-250 mL clear glass bottle -rinse bottle and cap three times, discard then fill to top of label -add 20 drops each nitric acid and potassium dichromate (**Caution:** HNO_3 and KCrO7 corrosive)

Steps:

1. Record time on submission sheet.
2. Let cold water flow for five minutes.
3. Record temperature on submission sheet.
4. Fill all bottles as per instructions.
5. Record chlorine residuals (free, combined and total), tubidity and pH on submission sheet.